Fishery Management Report No. 06-62

Fishery Management Report for Sport Fisheries in the Lower Tanana River Management Area, 2003 – 2005

by

Audra L. J. Brase

December 2006

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

FISHERY MANAGEMENT REPORT NO. 06-62

FISHERY MANAGEMENT REPORT FOR SPORT FISHERIES IN THE LOWER TANANA RIVER MANAGEMENT AREA, 2003 – 2005

by

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The Division of Sport Fish Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Since 2004, the Division of Commercial Fisheries has also used the Fishery Management Report series. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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ABSTRACT

Historic, current and future performance and management of the sport fisheries of the Alaska Department of Fish and Game (ADF&G) Region III Lower Tanana River Management Area (LTMA) is presented in this report. Particular emphasis is placed on the LTMA fisheries' performances and management from 2003-05.

The Tanana River drainage is the second largest tributary system of the Yukon River. The mainstem Tanana River is a large glacial system formed by the confluence of the Chisana and Nabesna rivers near Tok and the Alaska - Canada border which flows in a generally northwest direction for some 570 river miles to the Yukon River. The LTMA consists of all waters of the Tanana River drainage downstream from the Banner Creek drainage flowing into the Tanana from the north and the nearby Little Delta River drainage on the south.

Much of the human population in Region III is located within the Tanana River drainage along the Alaska, Richardson and Parks highways, and along the road system around Fairbanks. These highways and their secondary roads provide much of the access to the LTMA sport fisheries.

The majority of fishing effort in the LTMA occurs on the Chena, Salcha, Chatanika and Nenana rivers; Minto Flats; Harding Lake and various stocked waters. Sport anglers target many species in the LTMA, however the most commonly targeted species are: Chinook salmon *Oncorhynchus tshawytscha*, coho salmon *O. kisutch*, Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, northern pike *Esox lucius*, and lake trout *Salvelinus namaycush*.

As a means to assist Board members in acquiring information in a timely manner, Appendix D has been constructed (page 87). This table guides the reader to specific information contained within text, table and graphic format that may be useful in evaluating regulatory proposals.

Key Words: Arctic grayling, burbot, Chatanika River, Chena River, chum, Chinook, coho, Harding Lake, lake trout, LTMA, management, Minto Flats, Nenana River, northern pike, rainbow trout, Salcha River, salmon, sport fish, stocked waters, Tanana River, UTMA, whitefish, Yukon River

INTRODUCTION

The goals of the Alaska Department of Fish and Game – Division of Sport Fish are to:

- Sustain recreational fishing opportunities while optimizing social and economic benefits from these opportunities;
- Conserve, manage, and improve Alaska's aquatic, riparian, and upland habitats to ensure sustainability of Alaska's fishery resources;
- Foster a public that is consistently informed and involved in recreational fisheries; and,
- Recruit, develop, empower and retain a diverse dedicated, motivated, empowered and effective workforce.

In order to meet these goals the Division of Sport Fish management and research activities are primarily funded by a combination of State of Alaska Fish and Game (F&G) and Federal Aid in Fisheries Restoration monies. The F&G funds are from the sale of sport fishing licenses, stamps and permits. The D-J (Dingell-Johnson, named after the congressmen who wrote the act) funds are from a Federal tax on fishing tackle and equipment. D-J funds are provided to the state at a match of up to three-to-one with the F&G funds. There is also an amendment to the D-J Act (W-B, for Wallop-Breaux) that provides money to states for boating access projects at the same three-to-one match with F&G funds. The source of W-B money is a Federal tax on boat gas and equipment. Other, peripheral funding sources can include contracts with various government agencies and the private sector.

This report provides information for the Alaska Department of Fish and Game (ADF&G) Sport Fish Division Region III Lower Tanana Management Area (LTMA) and is one in a series of reports that are written annually updating fisheries management information about important sport fisheries within Alaska. The report is written to make that information available to the Alaska Board of Fisheries (BOF), Fish and Game Advisory Committees (AC), the general public, and other interested parties. It presents fisheries assessment information and the management strategies that are developed from that information. In addition, the report includes a description of the fisheries regulatory process, the geographic, administrative, and regulatory boundaries, funding sources, and other information concerning Division of Sport Fish management programs within the management area.

THE ALASKA BOARD OF FISHERIES

The Alaska BOF is the seven-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates fishery conservation plans for the State of Alaska. Board members are appointed by the Governor and must be confirmed by the legislature. A Board members' term lasts 3 years, and may be extended.

Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. The BOF meetings are usually during the wintertime, between early October and late March. Regulation proposals and management plans are received for evaluation by the BOF from ADF&G and the public (any individual or organization can submit a proposal to the BOF). During its deliberations the BOF receives input and testimony through oral and written reports from ADF&G staff, members of the general public, representatives of local Fish and Game advisory committees, and special interest groups such as fishermen's associations and clubs. Fishing regulations are published in Title 5 of the Alaska Administrative Code (5 AAC). The BOF last addressed proposals concerning LTMA fisheries in January 2004.

ADVISORY COMMITTEES

Local Fish and Game advisory committees (ACs) have been established throughout the state to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes. Advisory committee members are individuals from the local public who are nominated and voted on by all present during an advisory committee meeting. Most active committees in urban areas meet on a monthly basis throughout the fall and winter; active rural committees have generally only one fall and one spring meeting due to funding constraints. Advisory meetings allow opportunity for direct public interaction with department staff that answer questions and provide clarification concerning proposed regulatory changes. The ADF&G Boards Support Section provides administrative and logistical support for the BOF and the 81 ACs located throughout the state.

ADF&G EMERGENCY ORDER AUTHORITY

ADF&G has emergency order (EO) authority to modify time, area, and bag/possession limit regulations. EOs are implemented to deal with conservation issues that arise that are not adequately controlled by existing regulations. An EO may remain in effect until there is no longer a conservation concern and/or the BOF can formally take up the issue. EOs are also the mechanism by which inseason management of fisheries is accomplished. Inseason management is usually in accordance with a fisheries management plan approved by the BOF.

THE STATEWIDE HARVEST SURVEY

Recreational angling effort, catch, and harvest of important sport fish species in Alaska has been estimated and reported annually since 1977 (Howe et al. 1995, 1996, 2001a-d; Jennings et al. 2004, 2006 a-b, *In prep a-b*; Mills 1979–1994; Walker et al. 2003). The Statewide Harvest Survey (SWHS) is a questionnaire mailed out to a random selection of sport fish license holders. It is the instrument that provides the data analyzed to make the annual estimates of effort, catch, harvest, etc. ADF&G Division of Sport Fish Regional Technical Services (RTS) staff members typically produce the estimates for a particular year in September or October of the following year (i.e., the estimates for 2006 will be available in the late fall of 2007).

Effort, catch, and harvest are estimated on a site-specific basis, but estimates of effort directed toward a single species and the resulting species-specific catch-per-unit-effort (CPUE) information can seldom be derived from the report because effort is combined across all fisheries reported in the SWHS for a particular water body. Effort is estimated as number of anglers, number of trips, and most importantly, days fished. A "day fished" represents a visit to the water during which the angler fished, and not 24 hours of effort. Utility of the estimates is strongly dependant on the number of responses for a site (Mills and Howe 1992). Estimates based on 12 or fewer responses are useful only to document that fishing occurred. Twelve to 29 responses produce estimates useful for indicating relative order of magnitude and for assessing long-term trends. Estimates based on 30 or more responses are generally representative of levels of fishing effort, catch and harvest.

ADF&G SPORT FISH REGION III

Description

The Alaska Board of Fisheries (BOF) divided the state into several regulatory areas for the purpose of organizing the sport fishing regulatory system by drainage and fishery. ADF&G Sport Fish Division divides the state into three administrative regions with boundaries roughly corresponding to groupings of the BOF regulatory areas (Figure 1). Region I includes all of Southeast Alaska, including Yakutat. Region II covers portions of Southcentral Alaska, Kodiak, Southwestern Alaska, and the Aleutian Islands.

Region III includes two of the BOF fishery regulatory areas. They are the Upper Copper and Upper Susitna (UCUS) regulatory area (5 AAC 52, 2005-06) and the Arctic-Yukon-Kuskokwim (AYK) regulatory area (5 AAC 70, 2005-06). Prior to 1997 the Upper Copper/Upper Susitna Management Area was under the authority of Region II. Prior to 2000 the lower Kuskokwim River drainage (Kuskokwim Bay, and the Kuskokwim River upriver to and including the Aniak River) was also under the authority of Region II.

Region III is the largest of all the regions, encompassing the majority of the landmass of the state of Alaska with over 485,000 square miles of land; some of the state's largest river systems (Yukon, Kuskokwim, Colville, Noatak, Kobuk, upper Copper and upper Susitna River drainages); thousands of lakes and miles of coastline and streams. Regional coastline boundaries extend from Cape Newenham in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean (Figure 1). Region III as a whole is very sparsely populated, with the most densely populated area centrally located in the Tanana River valley and centered on Fairbanks (population 30,400; 2004 US census data).

Division of Sport Fish has further divided Region III into six fisheries management areas, roughly along drainage boundaries (Figure 1):

(1) The Northwest/ North Slope Management Area (Norton Sound, Seward Peninsula, Kotzebue Sound and the North Slope drainages).

(2) The Yukon Management Area (the entire Yukon River except the Tanana River drainage).

(3) The Kuskokwim Management Area (the entire Kuskokwim River drainage).

(4) The Upper Copper/Upper Susitna (UCUS) Management Area (the Copper River drainage and the Susitna River drainage above the Oshetna River).

(5) The Upper Tanana River (UTMA) Management Area (The Tanana River drainage upstream from Banner Creek and the Little Delta River).

(6) The Lower Tanana River (LTMA) Management Area (The Tanana River drainage downstream from Banner Creek and the Little Delta River; Figure 2).

Area offices for the six areas are located in Nome (intermittent)/Fairbanks, Fairbanks, Bethel (seasonal)/Fairbanks, Glennallen, Delta Junction, and Fairbanks, respectively.

Fishing effort and numbers of fish caught in Region III are low when compared to the other areas of the state (Tables 1 and 2). This is likely due to the lack of large easily accessible salmon fisheries in Region III. There are several outstanding areas to catch Chinook and coho salmon in Norton Sound, and some tributaries of the Yukon and Kuskokwim rivers, however these areas are fly-in only and there is some local bias against sport fishing, therefore little effort is currently expended by sport anglers at this time. As more roads are constructed and development continues in rural Alaska these remote salmon fisheries will likely become increasingly popular.

RESEARCH AND MANAGEMENT STAFFING

The Region III Division of Sport Fish staff biologists are organized into a research group and a management group. The management group consists of a management supervisor, an area management biologist (AMB) for each of the six management areas, one or more assistant area management biologists, and two stocked waters biologists. The AMBs evaluate fisheries and propose and implement management strategies through plans and regulations in order to meet divisional goals. A critical part of these positions is interaction with the BOF, ACs, and the general public. The stocked waters biologists plan and implement the regional stocking program for recreational fisheries. The research group consists of a research supervisor, research biologists, and various field assistants. The research biologists work together with the AMBs to plan and implement fisheries research projects in order to provide information needed to meet divisional goals.

The management and research staff conduct an annual regional area review in mid-winter. During this review the current status of important fisheries is considered and research needs are identified. Fisheries stock assessment research projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Projects are planned within a formal operational planning process. Results from these research projects are combined with information from the SWHS and input from user groups; and may be used to assess, propose and/or change management strategies.

LOWER TANANA RIVER MANAGEMENT AREA

Description

After the Koyukuk River drainage, the Tanana River drainage is the second largest tributary system of the Yukon River. The Tanana River basin (Figure 2) drains an area of approximately 45,155 square miles. The mainstem Tanana River is a large glacial system formed by the confluence of the Chisana and Nabesna rivers near Tok and the Alaska - Canada border which flows in a generally northwest direction for some 570 river miles to the Yukon River.

The Tanana River drainage is divided by Division of Sport Fish into two management areas - the Upper Tanana River Drainage Management Area (UTMA, commonly called the "Delta Management Area"), and the Lower Tanana River Drainage Management Area (LTMA, commonly called the "Fairbanks Management Area"). The LTMA consists of all waters of the Tanana River drainage downstream from the Banner Creek drainage flowing into the Tanana from the north and the nearby Little Delta River drainage on the south.

Much of the human population in Region III is located within the Tanana River drainage along the Alaska, Richardson and Parks highways, and along the road system around Fairbanks. These highways and their secondary roads provide much of the access to sport fisheries. The Fairbanks North Star Borough lies entirely within the LTMA, as does part of the Denali Borough. Communities and municipalities located within the LTMA include Fairbanks, North Pole, Fort Wainwright, Eielson Air Force Base, Nenana, Anderson, Healy, Cantwell, Manley, Livengood, Minto, Salcha, Two Rivers, Chatanika, Fox, and Ester.

A total of four Advisory Committees represent resource users in the LTMA: Fairbanks, Minto/Nenana, Middle Nenana River, and Lake Minchumina. The Fairbanks AC typically meets monthly from October through April, the Minto/ Nenana and Middle Nenana ACs typically meet at least twice a year, and the Lake Minchumina AC has not met in several years.

THE SWHS APPLIED TO THE TANANA RIVER DRAINAGE

The Tanana River drainage in its entirety is included in Statistical Area U of the Statewide Harvest Survey. While most sites for which effort, catch, and harvest are estimated are clearly within one of the two management areas, a few such as the "Middle Tanana River", "Other Lakes", and "Other Streams", overlap both areas. An attempt has been made to segregate those estimates between the LTMA and the UTMA.

In preparation for the development of this report, SWHS estimates of effort, catch, and harvest for the entire Tanana River drainage were segregated into separate sets of estimates for the UTMA and LTMA. The beginnings of timelines for estimates presented in this report vary depending on when it was possible to separate the LTMA and UTMA data. Some begin with the first reported estimates in 1977. Many begin in 1983, when increasingly detailed estimates became available covering more individual waters. In 1990 both catch and harvest estimates were produced (prior to 1990 only harvest was evaluated). Because of this and the relevance to the present status of the fisheries or more recent estimates, considerable emphasis is placed on estimates from 1990 to present. Some estimates in this report may differ slightly from SWHS reported results because of computational modifications when the segregation was undertaken or because adjustments were made to estimates by RTS after tables were composed for the Fishery Management Report (FMR).

DIVERSITY OF ANGLING OPPORTUNITY

Angling within the LTMA occurs at numerous rivers, lakes, ponds, and streams. Some of these water bodies are accessible directly from the road system and have some type of boat launch accommodating watercraft appropriate to the size and characteristics of the water body. Access to off-road waters may be made by foot (or skis), overland use of ATVs, snow machines, and/or dog team. Access to the most remote sites may requite light aircraft equipped with tundra tires, floats or skis.

Indigenous (wild stocks) and introduced (produced in hatcheries and stocked) fish are available to anglers. There are 18 fish species indigenous to the Tanana River drainage, 6 of these are commonly targeted by sport anglers, and all occur within the LTMA. They include: Chinook and coho salmon, Arctic grayling, burbot, lake trout, and northern pike.

Chum salmon *Oncorhynchus keta*, Dolly Varden *Salvelinus malma*, sheefish (inconnu) *Stenodus leucichthys*, least cisco *Coregonus sardinella*, humpback whitefish *C. pidschian*, broad whitefish *C. nasus* and round whitefish *Prosopium cylindraceum* are taken occasionally by sport anglers.

Longnose suckers *Catostomus catostomus*, Alaska blackfish *Dallia pectoralis*, lake chub *Couesius plumbeus*, slimy sculpin *Cottus cognatus* and Arctic lamprey *Lampetra japonica* are present but not targeted by sport anglers.

Rainbow trout *Oncorhynchus mykiss* are not native to the drainage, but have been stocked in many locations. Arctic char *Salvelinus alpinus*, coho salmon, Chinook salmon, and Arctic grayling, are also stocked in selected waters of the Tanana River drainage.

Opportunities for sport angling are available year-round in the LTMA. During the open water seasons sport fishing may occur wherever game fish are present, subject to time and/or area closures. Winter effort focuses on stocked lakes, with some effort directed toward lake and river populations of burbot and northern pike. Over the past 10 years (1994-2004) the LTMA has averaged approximately 4% of the total statewide sport fishing effort (number of days fished). In terms of fish harvested, the LTMA has averaged 4% of the statewide sport harvest, but 25% of the Region III sport harvest over the past 10 years (Table 2). The majority of fish harvested in the LTMA are Arctic grayling, northern pike and stocked species (rainbow trout and landlocked salmon; Appendix B).

Fishing guides, outfitters, and transporters take anglers to areas of higher quality fishing. Most transport is by aircraft or boat. Some commercial operators provide cabins or some sort of shelter, and/or boats for angler use. In the LTMA guides are known to operate in Minto Flats, and the Nenana, Salcha and Chena rivers. In 2005 a new freshwater guide program was implemented on a statewide basis. All freshwater guides must now be licensed annually with ADF&G and fill out a logbook recording their clients' fishing location, license number, residency and their daily catch and harvest by species. In the LTMA these data will provide the Area Management Biologist with previously unavailable information that will be useful for identifying areas that guides are using. This information will be used for making decisions regarding future research and/or management needs.

FISHERY ACCESS

Federal Aid funds help develop, improve and maintain access to sport fisheries throughout the state. In the LTMA a Federal Aid funded boat launch/ parking area was completed in 2005 on the Nenana River just south of the community of Nenana. In addition there is a new stocked lake/ river access/ campground project starting just south of Fairbanks, it is tentatively being called the

Tanana Lakes project and is being modeled on the existing Chena Lakes project that was developed when the Moose Creek Dam was built. Access funds have also been used to construct public use ice houses that are placed on Chena and/or Birch lakes.

SOCIAL AND CULTURAL ISSUES

Salmon fisheries are often the most controversial fisheries in Alaska and the LTMA is no exception. In terms of allocation of fish, subsistence fisheries always have a priority over commercial, personal use and/or sport fisheries. This priority can lead to regional and user group conflicts when commercial fisheries occur in the lower Yukon River before the subsistence users in the upper portion of the drainage have even seen any salmon in their fish wheels and nets.

Although hook and line is a recognized gear type used by subsistence salmon fishers in some parts of Alaska, subsistence users often perceive the catch and release practices of sport anglers as "playing with food." This often creates conflict between subsistence users who are fishing for food and sport anglers who may be fishing for an experience and do not necessarily want to keep the fish they catch.

The catch and release practices of sport anglers may become more accepted in rural Alaska as more residents are exposed to the style of fishing and have positive experiences with responsible sport anglers. However like any perception problem, it only takes a few careless anglers to give the majority of fishers a poor image.

LTMA MAJOR FISHERIES

Recreational angling occurs throughout the LTMA in many diverse areas, and anglers may target many different species of fish. This report will focus on the fisheries that consistently get the highest amount of effort and/or have had recent changes to the regulations which affect angling opportunity.

Chinook, Chum and Coho Salmon

Chena River

Background

The Chena River is a relatively slow moving, run-off, tannic-stained river that flows through the city of Fairbanks (Figure 3). It is approximately 160 miles long and in the summer of 1967 caused severe flooding in downtown Fairbanks. The flood was the impetus to begin construction in 1973 on the Moose Creek dam at river mile 45 (near the city of North Pole) to divert any future high water events away from populated areas. The dam was completed in 1979 and is operated and maintained by the US Army Corps of Engineers.

The Chena River supports one of the largest Chinook salmon populations in the Alaskan portion of the Yukon River drainage, with average annual returns of over 8,700 fish from 2001-05 (Table 3). Adult Chinook salmon enter the Yukon River during or shortly after breakup, and migrate into the Tanana River to appear in the lower Chena River (920 miles from the Bering Sea) between late June and the second week of July. They move up the Chena River to spawning areas which are primarily upriver from the fishery (the fishery is closed above the dam). The run ends in late July or early August. Chum salmon *O. keta* are caught incidental to the Chinook salmon in the Chena River.

There has been a Chinook salmon sport fishery at the Chena River since before statehood and it remained relatively small throughout the 1980s. Estimated harvests between 1983 and 1992 ranged from 0 to 375 fish, then increased dramatically in the mid - 1990s (Table 4). The 5-year average catch (2000-04) was 2,261 fish and average harvest was 505 fish. The Chena River Chinook salmon sport fishery continues to be relatively small, especially when compared with fisheries in Southcentral and Southeast Alaska; however it remains very popular as it is one of the few opportunities to catch large fish near Fairbanks. Most sport anglers release their catch as the salmon flesh is quite deteriorated by the time the fish have traveled the 1000+ miles from the Bering Sea (Table 4).

While run strength and river conditions can override effort in determining catch and harvest, the harvest potential of this fishery is likely increasing due to a combination of increased public awareness of its availability and improvements in the gear and fishing techniques used to target Chinook salmon.

The daily bag and possession limits for Chinook salmon in the Tanana River drainage have remained unchanged since the early 1960s, at one fish > 20 inches per day.

Fishery Management and Performance

Chena River Chinook and chum salmon escapements have been annually assessed since 1986 by mark-recapture experiments and/or a counting tower located at the Moose Creek dam (Table 3; Barton 1987, 1988; Barton and Conrad 1989; Brase *In prep*; Brase and Doxey 2006; Burkholder 1991b; Doxey 2004; Doxey et al. 2005; Evenson 1991–1993, 1995, 1996; Evenson and Stuby 1997; Skaugstad 1988–1990b, 1992–1994; Stuby and Evenson 1998; Stuby 1999–2001). The recent 5 year (2001-05) average escapement was 8,762 fish (Figure 5). Counting conditions at the dam can be highly variable depending on water height and river turbidity. In 2005 the Chena River was extremely high and turbid for most of the Chinook salmon run therefore an estimate of escapement was not produced. In contrast 2004 and 2006 had good counting conditions throughout the majority of the run and a good estimate of escapement was produced.

Historically, the Chena River Chinook salmon sport fishery was managed under a management plan with an escapement goal and a guideline harvest allocation for the sport fishery. An aerial survey escapement goal of 1,700 fish was set by Division of Commercial Fisheries in 1992. In 1993 Division of Sport Fish staff expanded this aerial survey escapement goal into an actual escapement abundance goal of 6,300 fish. This point objective was calculated based on averages of escapement data available at the time. The guideline sport harvest objective set by the BOF was 300 - 600 Chinook salmon. In-season management for the guideline harvest objectives was next to impossible because there was no mechanism for day-to-day enumeration of the harvest.

In 2000, a biological escapement goal (BEG) committee was formed to evaluate and calculate BEGs for Chena and Salcha River Chinook salmon and for some Yukon drainage chum salmon stocks. The BEG process was designed to set escapement ranges which maximize potential yield. The BEG committee recommended a BEG range of 2,800 - 5,700 Chinook salmon for the Chena River based on an analysis of run reconstruction data related to brood year returns.

The escapements in the Chena and Salcha rivers mirror each other sufficiently so that inferences regarding attainment of BEGs for both rivers can be made even if good data is available from only one of the rivers. If high water disrupts the counts in one of the rivers, but not the other, the escapement projections and estimates for the river in which an accurate estimate can still be

made are considered an index of the Chinook escapement in the other river, and are be used as a measure of run strength versus the BEG.

In 2001 the BOF adopted policy directing ADF&G to manage harvest so that escapements fall within the BEG ranges set by ADF&G. The BEGs will be evaluated and modified as needed on a 3-year cycle in synchrony with the 3-year BOF meeting cycle during which they address fisheries issues within the Yukon drainage. The guideline harvest ranges for the sport fishery were repealed.

Commercial and subsistence salmon harvests occur along almost the entire length of the mainstem Yukon and Tanana rivers (Figure 4; Tables 5 and 6). In 2001 the BOF adopted the *Chena and Salcha River King Salmon Sport Harvest Management Plan* (5 AAC 70.060, 2005-06) which mandated that all the downriver fisheries (commercial, subsistence, personal use and sport) be managed to fall within the Chena River Chinook salmon BEG range of 2,800 – 5,700 fish. In order to get that many fish on the spawning grounds restrictions may be placed on any or all of the Yukon and Tanana river fisheries.

In 2000 an EO was issued that restricted sport anglers from retaining any Chinook salmon in the Tanana River drainage due to lower river indicators of poor run strength. In 2001, a similar EO was issued, however it was rescinded in mid-July when the escapement was projected to be above the upper limit of the BEG range. In 2003 and 2004 the Chinook salmon runs were stronger than anticipated and EOs were issued to liberalize the bag and possession limits from 1 to 3 Chinook salmon per day in the Chena River (Appendix A). These emergency orders, in concert with management actions on the mainstem Yukon and Tanana river subsistence, commercial and personal use fisheries have enabled the Chena River Chinook salmon BEG goal to be met or exceeded every year since 1990 (Table 3).

Current Issues and/or Recommended Activities

Chinook salmon escapements have been estimated annually by using the Chena River dam as a counting station or by mark-recapture estimates, or both, since 1986 (Table 3). In previous years it was stipulated that if full tower counts could not be performed due to adverse river conditions for more than four consecutive days between Day 9 and Day 30 of the Chinook salmon run, then a mark-recapture experiment would be conducted (Doxey 2004). As escapement estimates and passage data have accumulated over the years and a BEG has been developed, the need for an unbroken series of escapement estimates has become less critical. This is important because electrofishing during the Chinook spawning run should be avoided if possible due to the probability of exposing salmon adults and eggs, as well as all other organisms in the 25+ foot wide path of the boat, to potentially harmful levels of electricity. Therefore more rigorous criteria have been developed to assess whether electrofishing is needed to obtain an escapement estimate in that particular year (Brase *In prep*). Consequently, there may not be a complete escapement estimate each year. However, partial documented abundance from tower counts is often sufficient to determine whether escapements are within or greater than the BEG range, and to project a likely estimate of total escapement

There has been some concern raised about the effect the Moose Creek Dam may have on Chena River salmon passage. The dam is designed to allow water to pass freely through three floodgates at normal river stages. Fish passage is unimpeded until the river rises, creating flood danger to property downstream. When flow exceeds 8,000 cfs, the floodgates are partially closed to maintain that flow rate downstream from the dam. Water is diverted along the floodway to the

Tanana River. The floodgates have seldom been lowered while adult Chinook salmon were passing through the structure, and then only for short periods of time. A fishway built into the side of the structure is designed to allow fish passage if a large volume of water is backed up behind the dam. Because the water rarely gets high enough to flow down the fishway, its potential to pass migrating salmon is essentially untested.

Historically Chinook salmon escapements to the Chena and Salcha rivers have roughly mirrored one another, with high or low escapements being seen in both rivers in a given year (Figure 5). However in 2006 the Chena River barely made escapement, whereas the Salcha River escapement was significantly higher than the upper end of the BEG range. It is suggested that in future Chinook salmon escapement goal examinations an analysis be performed to determine whether the Chena and Salcha rivers are indeed good surrogates for each other's escapement.

In 2007 a cooperative counting tower/ sonar project is expected to begin on the Chena River. Division oCommercial Fisheries Division will supply a Didson sonar unit, which will be used to evaluate salmon passage rates during periods of high water events. Division of Sport Fish will continue to perform salmon counts from the Moose Creek Dam and these numbers will be used for species apportionment of the sonar counts.

Salcha River

Background

The Salcha River is located approximately 40 miles east of Fairbanks via the Richardson Highway. It is a relatively clear rapid-runoff system, approximately 120 miles long originating in the Tanana Hills to the north (Figure 6). Numerous recreational cabins are located along the lower 70 miles of the river.

The Salcha supports the largest Chinook salmon run in the Tanana River drainage, with average annual returns of over 10,200 fish from 2001-05 (Table 3). Adult Chinook salmon enter the Yukon River during or shortly after breakup, and migrate into the Tanana River to appear at the mouth of the Salcha River (965 miles from the Bering Sea) between late June and the second week of July. They move up the Salcha River to spawning areas. The run ends in late July or early August. Chum salmon are caught incidental to the Chinook salmon in the Salcha River.

There has been a Chinook salmon sport fishery at the Salcha River since before statehood. The salmon fishery is accessible from the Richardson Highway at the bridge and nearby campground and down a trail near the Munson Slough parking area. Boaters launch at the campground and travel downstream to fish at the confluence of the Tanana and Salcha rivers.

The salmon fishery on the Salcha River is closed above a marker located about 2 1/2 miles upriver from the Richardson Highway Bridge (about 5 miles upstream from the confluence of the Salcha and Tanana rivers). Most of the spawning occurs upstream of this area.

The daily bag and possession limits for Chinook salmon in the Tanana River drainage have remained unchanged since the early 1960s, at one fish > 20 inches per day.

Fishery Management and Performance

The Salcha River Chinook and chum salmon runs have been annually assessed since 1987 using aerial surveys, mark-recapture experiments and/or a counting tower located near the Richardson Highway Bridge (Table 3; Barton 1988; Barton and Conrad 1989; Brase *In prep*; Brase and

Doxey 2006; Burkholder 1991b; Doxey 2004; Doxey et al. 2005; Evenson 1991-1993, 1995, 1996; Evenson and Stuby 1997; Skaugstad 1988–1990a, 1992-1994; Stuby and Evenson 1998; Stuby 1999–2001). The Salcha River counting tower is currently operated by staff from Bering Sea Fishermen's Association (BSFA) with funding from the US/ Canada Yukon River Pacific Salmon Treaty. BSFA closely follows the project design and methodology established by Division of Sport Fish for this project, and Division of Sport Fish provided some logistical support during start-up in 1999 and 2000. Contractor staff report Chinook salmon passage counts to both Divisions of Sport and Commercial Fish at the end of each shift so that ADF&G can calculate and track cumulative passage.

Until 1989 the Salcha River Chinook salmon fishery had a higher profile and higher Chinook salmon harvests than were seen on the Chena River. Estimated harvests between 1983 and 1992 ranged from 47 to 871 fish (Table 4). Catch and harvest did not increase as dramatically in the Salcha as in the Chena, but harvests have exceeded 1,000 fish in 3 of the past 11 years. The 5-year average catch (2000-04) was 1,465 fish and average harvest was 411 fish. The harvest potential of this fishery may be increasing due to improvements in the gear and fishing techniques used to target Chinook salmon.

The recent 5 year (2001-05) average Salcha River Chinook salmon escapement was 10,296 fish (Table 3). Counting conditions on the Salcha River can be highly variable depending on water height and river turbidity. However, in the past 3 years the Salcha River has experienced consistently good counting conditions.

Like the Chena River, the Salcha River is managed under the *Chena and Salcha River King Salmon Sport Harvest Management Plan* (5 AAC 70.060, 2005-06). Similar to the process already described under the Chena River Chinook Salmon section of this report, the BEG committee recommended and the BOF adopted a Salcha River Chinook salmon BEG of 3,300 – 6,500 fish in 2001. Similar to the Chena River, the Salcha River Chinook salmon BEG range has been met or exceeded every year since 1990 (Table 3).

Typically more sport anglers target Chinook salmon on the Salcha River than on the Chena River, this may be because of the greater water clarity, the larger run size or the ease of access to good fishing locations. The EOs that were put in place for Chena River Chinook salmon in 2001, 2002, 2003 and 2004, also applied to Salcha River Chinook salmon (Appendix A). In 2006 an EO was issued to liberalize Chinook salmon bag and possession limits from 1 to 2 fish on the Salcha only, as the Chena River showed insufficient strength to liberalize the sport limits.

Current Issues and/or Recommended Activities

A recommended activity for the Salcha River is to continue cooperation with BSFA contractors in order to receive daily updates of the number of salmon passing the counting tower and river conditions.

At the 2007 BOF meeting the Board will deliberate over Proposal 177 that seeks to allow the use of archery equipment to harvest Chinook salmon in the Salcha River. The use of archery equipment in sport fishing regulations throughout the state has applied to species with no limits or liberal harvest limits (i.e., whitefish, suckers, burbot), or northern pike from September 1 through April 30. The effectiveness of harvesting Chinook salmon with archery gear is unknown and there is potential for increased mortality in Chinook salmon that are injured or wounded when not hit in an appropriate location and escape. There is also a “no release” option with

archery gear as Chinook salmon caught are unlikely to survive if released, due to the nature of gear. The use of archery equipment or "bowfishing" in other states target "rough" or "trash" fish that are generally not targeted by sport anglers, adoption of this proposal would set a precedent in sport fisheries management.

Chatanika River

Background

The Chatanika River is located approximately 30 miles north of Fairbanks and is accessible via both the Elliot and Steese Highways (Figure 7). The Chatanika River is a clear or lightly tannic stained rapid-runoff stream, and flows through valleys between summits and uplands for about four-fifths of its length before it enters Minto Flats. At that point the character of the river changes from one typical of rapid- runoff upland streams with pools, riffles, cutbanks and gravel bars and a substrate consisting largely of gravel or broken rock; to a slower stream with an incised channel with high, fairly stable banks and a bottom substrate consisting primarily of sand and organic material. Mining activity dominated the upper Chatanika during the first half of the 20th century. There are currently recreational cabins scattered along the river's length with a few small mining claims still in operation.

The Chatanika River supports small spawning populations of Chinook and chum salmon. A fishery for Chinook salmon occurs on the Chatanika River downstream from a marker located 1 mile upstream from the Elliot Highway Bridge. Salmon fishing is closed upstream from that marker to protect spawning fish. Chum salmon are caught incidental to the Chinook salmon in the Chatanika River.

Chinook salmon run timing on the Chatanika River is similar to that of the Salcha and Chena rivers, with the run and fishery occurring in July. The Chinook salmon population was assessed sporadically by boat and then annually from a counting tower from 1998–2005 (Table 6; Brase and Doxey 2006; Doxey 2004; Doxey et al. 2005; Stuby 1999–2001). The counting tower project was discontinued in 2005 due to high water conditions resulting in poor viewing conditions and therefore poor quality estimates in most years.

The daily bag and possession limits for Chinook salmon in the Tanana River drainage have remained unchanged since the early 1960s, at one fish > 20 inches per day.

Fishery Management and Performance

Due to a lack of a long time series of return data, there is no BEG associated with the Chatanika River Chinook salmon population. The run is small and attracts little effort. The 5-year (2000-04) average catch is 64 fish and harvest is 15 fish (Table 4).

When an EO is implemented restrictively changing the fishing regulations for Chinook salmon based on information from the Chena and Salcha rivers or downriver (Yukon and Tanana River) run indicators, it covers all of the Chinook salmon fisheries in the Tanana drainage, including the Chatanika River. However, EOs relaxing in-season restrictions or liberalizing standard regulations may not apply to the Chatanika River and other Tanana River drainage stocks if the information is based only on tower count information from the Chena and Salcha rivers and there is not solid information as to run status in the other streams.

Current Issues and/or Recommended Activities

The Chatanika River drainage was an important mining area from the 1920s through 1950s. In 1926 the Davidson Ditch Diversion Dam was built. It was used to support industrial activity in the area until it became inoperable in 1967 due to flood damage. In 2002 the dam was removed through a cooperative partnership among the Yukon River Drainage Fisheries Association (YRDFA), the U.S. Fish and Wildlife Service (USFWS), the Bureau of Land Management (BLM), the National Oceanic and Atmospheric Administration (NOAA), and ADF&G. This project restored fish passage to more than 65 miles of upstream habitat for Chinook and chum salmon. Staff from the Bering Sea Fishermen's Association (BSFA) annually monitor the watershed above the old dam site for recolonization by salmon adults and/or juveniles (C. Stark, Fisheries Biologist, BSFA, Fairbanks; personal communication).

Nenana River

Background

The Nenana River drainage is a turbid glacier fed system located approximately 45 miles south of Fairbanks. The lower portion of the drainage is accessible via the Parks Highway, and the upper portion of the drainage is accessible via the Denali Highway (Figure 8). Most angling effort occurs in the clearwater tributaries of the Nenana River such as Brushkana, Julius, and Clear creeks. There are recreational cabins scattered throughout this area, and it is a popular location for fall moose hunts. There is some sport fish guide activity in the area.

Coho salmon become available in the Tanana River drainage fisheries during September. They spawn in groundwater-fed stream systems (commonly known as "clearwaters"). The Nenana River drainage is believed to support the largest coho salmon spawning population in the LTMA and has been surveyed sporadically by boat and aerial survey since 1974 (Table 7). The LTMA coho population is very small compared to the Delta Clearwater River (DCR) in the UTMA. Coho salmon escapement to the DCR has averaged over 60,000 fish annually in the past 5 years (Parker *In prep*).

In the LTMA coho salmon are harvested in tributaries of the Nenana River system near the community of Anderson, and in a few "other streams." These are small-scale fisheries (Table 8). The 5-year (2000-04) average coho salmon harvest in the LTMA was 88 fish. No coho salmon were harvested in the LTMA in 2005. The coho salmon bag and possession limit is 3 fish/ day.

Fishery Management and Performance

In-season management of coho salmon sport fisheries is driven by down-river indicators and also by run strength in the Delta Clearwater River in the Upper Tanana River Management Area.

Current Issues and/or Recommended Activities

Although effort and catch rates are currently sporadic and low, this may change as people continue to build more recreational cabins in the area and natural gas exploration/development in the area comes to fruition.

More consistent surveys should be performed on the clearwater coho systems of the Nenana River drainage to better assess the size and distribution of the coho salmon stock.

Other LTMA Salmon Fisheries

Other minor sport fisheries for chum and coho salmon occur in the LTMA. Summer chum salmon are primarily available in July and August during and just after the Chinook salmon fisheries and are targeted or caught incidentally as a secondary species. There is a run of fall chum salmon that arrives to the Tanana River drainage in September, but they are not generally targeted by anglers. While summer chums are generally more abundant than Chinook salmon, are subject to a more liberal daily bag and possession limit (3 fish/day), and are readily taken on certain types of spinning gear; the average catch and harvest is lower than that for Chinook. The poor quality of summer chum salmon flesh for human consumption is likely a contributing factor. The 5-year (2000-04) average chum salmon harvest in the LTMA was 103 fish (Appendix B).

Arctic Grayling

Chena River

Background

The Chena River Arctic grayling fishery has been popular since before statehood, and has increased in stature as the Chena Valley has been developed and access has improved. The grayling fishery is almost entirely an open water fishery, occurring from April through October. Anglers target grayling throughout the road and boat accessible sections of the river and its tributaries, and some are transported to the headwaters by aircraft to begin float trips during which they fish for grayling. Badger (Chena) and Piledriver sloughs are important components of the Chena River grayling fishery as they provide rearing areas for lower river grayling and easily accessible fishing locations.

Because of its accessibility, the Chena River grayling stock offers angling opportunity to a broad socio-economic and age spectrum of anglers. These range from youngsters to adults, anglers of varying levels of income and angling experience, those living within easy walking distance to the river to those able to afford guiding services or transportation enabling them to fish in the upper river away from the road system. There is road access to the river from Eielson Air Force Base and the river flows through Fort Wainwright army base, giving military personnel direct access to the river. The Chena River State Recreation Area is visited by residents and non-resident visitors to Alaska traveling along the road system. Many of them go fishing. The Chena River grayling stock is enjoyed by anglers motivated to pursue high-quality fishing and by those who simply wish to go fishing.

The SWHS divides the Chena into the "upper river" and "lower river" at river mile 71, and provides estimates of effort, catch, and harvest of all species for each section. Species distributions and the regulations restricting salmon fishing and the use of bait above the dam at river mile 45 dictates that almost all of the effort in the SWHS-designated upper river is directed toward grayling. The lower river supports a multi-species fishery, including a Chinook salmon fishery which appears to be growing. So while the majority of the effort in the Chena River is probably directed toward grayling, effort has not yet been apportioned between species and the multi-species fishery confounds attempts to describe the total effort targeting grayling within the Chena River fisheries.

Fishery Management and Performance

Stock assessment projects began in the Chena River in the early 1970s. Electrofishing boats (shockerboats) were the primary tool for collecting fish. The methodology evolved to entail an annual mark-recapture abundance estimate using two boats simultaneously to sample most of the width of the river. Two passes by the two boats over the lower 90 miles of the river were required.

From the late 1970s through the mid-1980s, the Arctic grayling fishery on the Chena River was the largest grayling fishery in Alaska. Annual fishing effort for the period 1979 - 1986 (for all species) averaged about 33,000 angler-days (Appendix C). Between 1986 and 1987 population abundance declined from 61,581 fish to 31,502 fish a reduction of 49% (Table 9; Clark and Ridder 1987a, 1988). As the population declined, more restrictive regulations were implemented. The bag limit was reduced (from 10 per day to 5 per day), fishing was restricted to catch and release during the spring spawning period, and the use of bait was eliminated in 1987. As a result of a population decline of Arctic graying in the upper Chena River beginning in the mid-1980s, harvest decreased from 27,077 fish in 1984 to 6,240 fish in 1985, a 76% reduction in harvest (Table 10). During that same period effort declined from 33,691 to 19,737 days fished (Appendix C).

Although harvest decreased for 2 years after the imposition of these restrictions, and abundance estimates increased, both harvest and effort increased substantially in 1989, prompting the lowering of the bag limit from five per day to two per day. This additional restriction was not sufficient to reduce harvest to sustainable levels, and in 1991 the fishery was further restricted by EO to catch-and-release only (Appendix A). The BOF made this a permanent regulatory change in 1994. Estimates of total effort for the Chena River between 1994 and 1998 averaged about 33,400 days fished. The recent 5-year average (2000-04) catch was 44,453 fish (Table 10) and average effort of 22,967 days fished (Appendix C).

In addition to eliminating sport harvest through regulation changes, the department initiated a program of Chena River stock enhancement by stocking hatchery and pond-reared Arctic grayling that were spawned from Chena River stock. In 1993 and 1994 approximately 61,000 fish/ year were stocked into the Chena River. Survival of these fish was estimated as part of the ongoing stock assessment efforts during 1993, 1994, and 1995. Survival of introduced fish was determined to be too low to justify the cost of the enhancement effort and stocking was not continued after 1994 (Clark 1994, 1995 and 1996).

After the change in fishing regulations, catches and effort dropped off; however they have remained relatively stable in recent years due to the river's close proximity to Fairbanks and ease of access (Table 10). The Chena River grayling population continued to be assessed with mark-recapture experiments from 1991-1998, and then again in 2005 (Table 9; Clark et al. 1991); Clark 1994, 1995, 1996; Ridder 1998, 1999; Ridder and Fleming 1997). These surveys show a grayling population that is stable, but likely cannot sustain a large annual harvest that would be similar to historic levels.

In 2004 the BOF adopted the *Wild Arctic Grayling Management Plan* (5 AAC 70.055, 2005-06) that stated that ADF&G would manage the Region III Arctic grayling fisheries for long-term sustained yield while providing and/or maintaining fishing qualities that anglers desire. The Grayling Management Plan has three management approaches; Regional, Conservative and Special. Each of these approaches has different ways of meeting the goals of sustained yield

(reduce bag and possession limits, reduce fishing season, only allow catch and release, modify other methods and means). The Chena River is in the Special Management Approach category.

Current Issues and/or Recommended Activities

The department has developed a *Fishery Management Plan for the Chena River Arctic Grayling Sport Fishery*. This plan is currently in draft form, after it has gone through a full review it will be used to manage the Chena River grayling population. The management objectives in the draft plan are:

- In the upper river (river-miles 45-90) maintain a minimum abundance of 8,500 grayling over 12 inches (~305mm) in total length.
- In the lower river (downriver from river –mile 45 (the Moose Creek dam)) maintain a minimum abundance of 2,200 grayling over 12 inches (~305mm) in total length.

At the 2007 BOF meeting the Board will deliberate over Proposal 124 that seeks to allow a limited harvest of Arctic grayling less than 12 inches from June 1 – July 15 below the Nordale Bridge on the Chena River. Although there is strong public desire to maintain the Chena River as a catch and release fishery, there is a component of Fairbanks spot anglers who would like to be able to retain a grayling for consumption.

Salcha River

Background

The Salcha River Arctic grayling fishery has supported increasing catch and fairly consistent harvest over recent years and provides a substantial proportion of the harvest opportunity for grayling in the LTMA (Table 10). The majority of the grayling fishing opportunity is accessible only by boat, and a high proportion of the effort is from people who have property along the river, and their visitors. Some commercial guiding for Salcha River grayling is also taking place.

Prior to 1987 the Salcha River grayling bag limit was 5 fish per day, 10 fish in possession, with no size limit and no closures. The current Salcha River grayling regulations have been in place since 1987. The current bag and possession limit is 5 fish $\geq$12 inches/ day and grayling may not be kept during the spawning period (April 1 – May 31).

Fishery Management and Performance

Effort on this multi-species fishery may be impacted by many factors including: the quality of the annual Chinook salmon fishery, high water events that can make grayling fishing very difficult, low water events that can limit boat access to fishing areas, the weather, and the timing of breakup and freeze up (Appendix C).

The Salcha River grayling harvest was higher prior to the regulations that were imposed in 1987 instituting a 12-inch minimum length limit, restrictions on the use of bait, and the restriction to catch and release only during the spring spawning period (Table 10). The restrictions, along with the fact that the fishery is located mainly off of the road system are probably causing the grayling harvest rate to remain steady. Overall, catch peaked at about 27,000 grayling in 1997 and harvest at about 3,000 fish, and both appear to be stabilizing at a lower level (Table 10).

The Salcha River was annually assessed from 1988-1994 and the population appeared to be stable or possibly increasing (Table 11; Clark and Ridder 1987b, 1988, 1990; Clark et al. 1991;

Ridder et al. 1993; Roach 1994, 1995). It is difficult to make direct population comparisons from year to year because different areas were sampled, sampling occurred at different times of year, and different size classes were available. The Salcha River grayling population was most recently assessed in 2004, and preliminary estimates suggest a summer population of 2,170 fish ≥ 260 mm, which is similar to the 1994 estimate of 5,774 fish ≥ 235 mm. (Table 11; A. Gryska, Sport Fish Biologist, ADF&G, Fairbanks; personal communication).

Salcha River grayling are managed under the *Wild Arctic Grayling Management Plan* Regional Management Approach. In terms of catch, harvest and effort, the Salcha River grayling fishery appears to be very stable, with a recent 5-year average (2000-04) harvest of 1,232 fish (Table 10). In 2005 the Salcha River grayling catch was 6,525 fish (94% of the 5-year average), and harvest was 806 fish (65% of the 5-year average). The current regulations appear to be satisfactory to anglers as there have been no proposals put forth in recent years to change the bag and possession limits on the Salcha River.

Current Issues and/or Recommended Activities

A Salcha River Grayling Management Plan may be developed that sets thresholds for regulatory action if stocks should decline, and reinstates the present regulatory regime when stocks recover.

Chatanika River

Background

The Chatanika River grayling sport fishery has likely been in existence in one form or another since the gold rush in the early 1900s. The grayling population undoubtedly went through periods of severe decline while either or both fishing and mining activity were unrestricted. Although it is difficult to say to what extent the stock has subsequently recovered, the Chatanika River continues to support a low density but viable grayling population.

In the upper river, anglers focus almost entirely on grayling; while in the lower river grayling, pike, burbot, sheefish, salmon, and whitefish are all targeted by anglers. Prior to 1992, the Chatanika River grayling bag and possession limit fell under the background regulations of 5 fish/day, with no size limit. Current regulations allow for a daily bag and possession limit is 5 fish and all must be ≥ 12 inches in total. Grayling may not be retained during the spawning closure from April 1 through May 31.

Fishery Management and Performance

Arctic grayling have been assessed intermittently in the Chatanika River since 1972 (Table 12; Clark et al. 1991; Fish 1996; Fleming et al. 1992; Holmes 1983, 1985; Holmes et al. 1986; Ridder et al. 1993; Roach 1994, 1995; Tack 1973; and Wuttig 2004). Because the Chatanika River is difficult to survey due to its length and shallow depth, abundance has been reported as a density index, rather than a point estimate (Table 12). In the most recent surveys researchers reported no immediate conservation problem for Chatanika River grayling, but stream productivity is low (Fleming 1998; Wuttig 2004). Grayling densities were lower in the Upper River and concerns were expressed about the potential for stock depletion in the upper river should fishery mortality increase.

Chatanika River grayling are managed under the *Wild Arctic Grayling Management Plan* Regional Management Approach. Catch and harvest of grayling on the Chatanika has remained

relatively stable in recent years, with a recent 5-year average (2000-04) harvest of 797 fish (Table 10).

Current Issues and/or Recommended Activities

A grayling summer population assessment study is being planned for the Chatanika River in 2007.

A Chatanika River Grayling Management Plan may be developed that sets thresholds for regulatory action if stocks should decline, and reinstates the present regulatory regime when stocks recover.

Nenana River

Background

The Nenana River drainage grayling fishery occurs primarily in small clearwater streams off of the mainstem Nenana and Teklanika rivers. Fishing occurs during the open water periods. A radiotelemetry study performed in 2001-02 demonstrated the importance of the Brushkana River as a spawning system within the upper portion of the Nenana River drainage. Radio-tagged grayling that spawned in the Brushkana River overwintered in the mainstem Nenana River or other large tributaries (Gryska *In prep*). As a result of this work, the Nenana River Arctic grayling stocks are considered one stock for management purposes.

Fishery Management and Performance

The Nenana River drainage falls under the *Wild Arctic Grayling Management Plan* Regional Management Approach and the background bag and possession limit of 5 fish/ day with no size limit and no spawning closure. Effort and catch rates have been sporadic and low, however they both appear to be increasing with a 2005 harvest of 1,619 fish, which was 286% of the recent 5 year (2000-04) average harvest of 567 fish (Table 10), and 2,086 days fished in 2005, which was 136% of the recent 5-year average effort of 1,535 days (Appendix C). As people continue to build more recreational cabins in the area and natural gas exploration in the area comes to fruition sport fish effort and harvests may continue to increase.

Current Issues and/or Recommended Activities

A Nenana River Grayling management plan may be developed that sets thresholds for regulatory action if stocks should decline, and reinstates the present regulatory regime when stocks recover.

Other LTMA Grayling Fisheries

Background

Arctic grayling are popular with recreational anglers, are generally abundant, and occur in many LTMA rivers and streams besides the major fisheries previously detailed. Access ranges from roadside fisheries to those accessible only by traveling by boat along major rivers to the mouth of the tributary containing grayling. As with almost all grayling fisheries in the Tanana River drainage, these fisheries take place during the open-water season.

Fishery Management and Performance

With the exception of Five Mile Clearwater, the grayling fisheries in these other small streams fall under *Wild Arctic Grayling Management Plan* Regional Management Approach and the background bag and possession limit that was instituted in 1975 for grayling in the Tanana River drainage (5 fish/ day and no size limit and no spawning closure).

The Five-Mile Clearwater River is in the *Wild Arctic Grayling Management Plan* Conservative Management Approach, with a daily bag and possession limit of 2 fish, only one of which may be over 12 inches long.

Reported catch and harvest rates vary considerably, in part because many of these small fisheries enter and drop out of the SWHS report from 1 year to the next, depending upon whether any of the small number of anglers utilizing them are selected for inclusion in the SWHS. The effort, catch and harvest rates for these small fisheries are not included in this report as they are based on few angler responses and are therefore much more variable than the areas with higher effort.

Current Issues and/or Recommended Activities

Continue to monitor these small fisheries through the SWHS and watch for trends which may indicate a fishery is getting higher use and may warrant further research or management activities.

Northern Pike

Minto Flats

Background

Minto Flats is located about 35 miles west of Fairbanks between the communities of Nenana and Minto (Figures 9 and 10). It is an approximately 500,000-acre area of marsh and lakes interconnected by numerous sloughs and rivers. Most of the area is included in the Minto Flats State Game Refuge which was established by the Alaska Legislature in 1988 to ensure the protection and enhancement of habitat, the conservation of fish and wildlife, and to guarantee the continuation of public uses within the area. The Chatanika, Tolovana, and Tatalina rivers and Washington, Goldstream, and numerous smaller creeks flow into Minto Flats, coming together as tributaries to the Tolovana River, itself a tributary to the Tanana River at its mouth at the southwestern end of the Flats. The waterways of the Flats are slow and meandering.

The Minto Lakes are a major northern pike spawning and summer feeding area. In winter much of the flowing and standing water within the Flats becomes anoxic, forcing fish to move to waters of the Tanana River or up tributary rivers to oxygenated areas. Winterkill is common, and can be a confounding factor in attempts to predict fish population dynamics and assess angler impact. The Minto Flats fisheries are accessed primarily by boat and float plane. Northern pike are typically the only fish targeted by sport anglers in the Minto Flats area. These large piscivorous predators are located throughout the Flats and can be readily taken on many types of lures.

The northern pike fishery of the lower Chatanika River is included in this section because the Minto Lakes and Chatanika River northern pike stocks are commingled, the fisheries overlap, and the lower 35 miles of the Chatanika River is within Minto Flats. Similarly, because effort, catch, and harvest estimates for the Tolovana River appear occasionally in the SWHS data; and

because Minto Flats and all of its waters are within the Tolovana River drainage general references in this section to the Minto Flats complex and/or Tolovana drainage should be considered a summation of effort/ harvest or catch of pike in the Tolovana River, Minto Flats, and the lower Chatanika River drainage.

A group of interconnected lakes in the eastern Flats is called the Minto Lakes. These lakes are generally shallow and heavily vegetated. The Minto Lakes are a popular pike fishing and waterfowl hunting area, and in addition to those who use boats, there are both guiding services and private pilots that travel to the lakes in floatplanes. Guides and private individuals have cabins on some of the sparse areas of higher ground that are not regularly flooded. The Minto Lakes support the majority of the northern pike sport fishery within the Tolovana River drainage.

The Tolovana drainage/Minto Flats complex sport fishery has supported a major proportion of the LTMA northern pike sport fishery for many years (Table 13). It was primarily a summer fishery until the mid-1980s, when an intensive sport fishery developed on concentrations of northern pike that were overwintering in the Chatanika River just upstream from the mouth of Goldstream Creek. A subsistence fishery for northern pike (and whitefish) occurs near Minto Village and at historically used sites in the eastern portions of Minto Flats (Andrews 1988). Gill nets are used throughout the open-water period and pike are taken through the ice with hook and line.

Currently Minto Flats is closed to sport fishing from October 1 – May 31, the daily bag and possession limit is 5 fish, only 1 of which may be > 30 inches long.

Fishery Management and Performance

Pike population assessments have been performed in the Minto Lakes area every 3 to 5 years since 1987. Estimates of the abundance of pike $\geq$ 525 mm has remained in the range of 11,000 – 27,000 fish every year of the survey (Table 14). The most recent estimate in 2003 was 13,900 fish $\geq$ 525mm (Scanlon *In prep*). This assessment is mandated by the *Minto Flats Northern Pike Management Plan* (5 AAC 70.044, 2005-06) which stipulates that the maximum exploitation rate of all users in the lower Chatanika River and Minto Lakes/Goldstream Creek area may not exceed 20% annually.

From 1984 – 1986 the total harvest of pike from the Minto Flats complex doubled (Table 13) and many of the fish harvested were large females. It was believed and later demonstrated by radiotelemetry studies (Roach 1998b) that these fish were the spawning stock for the Minto Lakes. After 1987, regulations were implemented closing sport fishing for northern pike at Minto Flats between October 1 and May 31, and the bag limit was reduced from 10 to 5 fish per day, only 1 of which may be > 30 inches long.

Estimated catch and harvest in the Minto Flats complex peaked in 1994 with a catch of 52,191 fish and a harvest of 9,489 fish. Estimated catch and harvest continued to decline until 2001, when reported catches started to increase. A significant increase in harvest was noted in 2003, when harvest went from 650 fish in the Minto Flats complex, to 1,284 fish (Table 13). The current catch/harvest trend continues to be on the upswing, although not approaching the record harvest from 1994. Estimated effort in Minto Flats has not increased as dramatically as the pike harvests, although the 2005 estimate of 3,124 days fished was 181% of the recent 5-year average of 1,722 days (Appendix C). Although effort is not estimated by target species, it is felt that the

majority of the effort at Minto Flats is directed toward northern pike and that estimates of catch, harvest, and effort for Minto Flats are an acceptable trend index for the pike fishery.

Although Minto Flats is closed to pike sport fishing from October 15 through May 31, there is a subsistence fishery that occurs throughout the winter. To participate in any subsistence fishery, one needs to be an Alaska resident. If a resident wishes to participate in the subsistence fishery in the Tolovana River they must acquire a Tolovana Subsistence Pike Permit from the ADF&G – Commercial Fisheries Division in Fairbanks. Subsistence users commonly harvest pike near the confluence of the Chatanika River and Goldstream Creek late in the winter. The winter subsistence pike harvest has averaged 490 fish over the past 5 years from an average number of 29 permit holders (Table 15).

Current Issues and/or Recommended Activities

Verbal angler reports suggest that there are more guided and/or drop-off pike fishing trips occurring in the Minto Flats complex (fly-in and boat-in trips). Although the SWHS estimates show that catch, harvest and effort are increasing, one cannot say whether that is from guided or unguided anglers. In 2006 an effort assessment was attempted on June 17 to count the number of fishers, and assess their perceptions about the fishery. Unfortunately there were only 3 groups of anglers in the area on that particular day and it was their first time fishing in the Minto Lakes so they didn't have historical perspectives. In the future more surveys should be performed, and more contacts made with fishing guides and drop-off charter operators.

The next Minto Lakes pike population assessment survey is scheduled for June 2008.

Harding Lake

Background

Harding Lake is currently closed to pike fishing. This section is included to give the reader a historical perspective and an update to the fishery.

Harding Lake is located about 45 road miles southeast of Fairbanks along the Richardson Highway (Figure 11) and is the largest roadside lake north of the Alaska Range. Harding Lake is a very popular recreational destination and approximately 75% of the lake's shoreline contains road-accessible cabins.

Northern pike were a high profile game fish in Harding Lake because they were readily caught and their preference for shallow water habitats made them highly visible to anglers. This is in contrast to the other large predators (burbot, lake trout, and Arctic char), which are available to anglers at lower density populations in deep water. In 1991, pike fishing at Harding Lake was closed between April 1 and May 31, spear fishing was closed, and a 26 inch minimum length limit was imposed.

As northern pike generally increased in popularity as a game fish (Doxey 1991) and anglers became more aware of their presence in Harding Lake, harvests increased through the 1980s (Table 16), then fell dramatically during the early 1990s (in part due to regulatory changes) and declined again after 1995. Catches peaked in 1993 at about 8,500 fish and declined slowly thereafter to about 1,400 in 1998.

Prior to the fishery's closure the majority of the effort at Harding Lake was likely directed toward northern pike. Estimated effort increased through the mid-1980s and averaged around

5,000 angler-days from 1991 to 1994 (Appendix C). Effort increased to approximately 6,700 angler days in 1995 and 1996, and then declined thereafter to about 3,400 angler days during 1997 - 1998.

Abundance estimates for northern pike were conducted at Harding Lake annually during the period 1990-1999 except in 1994 (Table 16). Abundance of northern pike $\geq$ 300 mm increased from about 2,300 fish in 1990 to about 3,800 fish in 1993. Estimated abundance increased between 1995 and 1996, from 2,338 to 3,337, but declined to 1,780 in 1997 (Roach 1998a). The abundance estimate in 1998 was 1,376 pike $\geq$ 300 mm (~12 inches).

In 1998 a risk and sustained-yield analysis was completed as part of the research studies on the Harding Lake northern pike population. The risk analysis assessed the likely ability of various regulatory regimes to maintain the northern pike spawning population at about 1,728 fish (the abundance calculated to produce the maximum sustained yield of approximately 400 fish). The recommendation was to increase the minimum length limit from 26 inches to 30 inches (Roach and McIntyre 1999). Plans were made to pursue this recommendation at the January 2001 BOF meeting.

Estimated catch (828) and harvest (38) of northern pike in Harding Lake during 1999 was the lowest recorded. An abundance and age composition estimate revealed that the population of northern pike $\geq$ 300 mm (~12 inches) had declined to 583 fish and that a recruitment failure was occurring (Table 16; Scanlon and Roach 2000). Only about 11% of the population consisted of young fish between age-1 and age-6. These diminished cohorts (ages 2-5) were the recruitment from strong parent classes (1993 -1997) when adult northern pike were abundant in the lake. The loss of most of the high-quality spawning and rearing habitat as the lake level dropped in the mid-to late 1990s likely caused the recruitment failures. Scanlon and Roach (2000) alluded to descriptions in fisheries literature of the importance to survival of young of the year northern pike of vegetated zones like those that have disappeared in Harding Lake. Young pike prefer warm, shallow, productive, and sheltered areas. Cannibalism is a major mortality factor acting upon young of the year fish and fingerlings when cover is not available.

On May 1, 2000 an EO was issued closing northern pike fishing in Harding Lake until further notice (Appendix A). In January 2001, the BOF adopted a proposal indefinitely closing northern pike fishing in Harding Lake.

Fishery Management and Performance

Over the past 10 years the water level at Harding Lake has declined from approximately 717 to 715 feet ASL (Table 16), resulting in the loss of shallow wetland habitat primarily at the north end of the lake. This area comprised the majority of the northern pike spawning and rearing habitat on the lake. The loss of pike habitat resulted in recruitment failures in the late 1990s (Scanlon and Roach 2000) and led to an emergency closure in 2000 (Appendix A), followed by a complete closure of the Harding Lake pike fishery in 2001 by the BOF. The demise of this pike fishery was a great loss to residents of the Interior as Harding Lake supported the only road accessible quality pike fishery.

Current Issues and/or Recommended Activities

In 2005 funding was secured to build a structure that will restore the flow of Rogge Creek into Harding Lake. The water control structure is scheduled to be completed by the spring of 2007

and is designed to restore and maintain the Rogge Creek-Harding channel. The channel will flow directly into Harding Lake and will help restore the lake's water level and recover approximately 135 acres of wetlands on the north shore. ADF&G presumes that the remaining pike in Harding Lake will take advantage of the spawning habitat once the dry northern shoals are once again covered with sufficient water.

A *Fishery Management and Restoration Plan for the Harding Lake Northern Pike Sport Fishery, 2001-2004* (Doxey 2003) was written to document the step-wise approach that will be proposed to the BOF regarding when and how the fishery will be reopened once the Harding Lake pike population begins to recover. It is unclear how long it will take for the pike population to recover to sufficient levels to allow a targeted fishery to occur.

Other LTMA Pike Fisheries

Background

Pike are common in many smaller lakes and in sloughs and tributaries of the Tanana River, and small harvests are reported annually from many locations throughout the LTMA. The lower Chena, Zitziana, and Salcha rivers, Piledriver Slough, and gravel pits in south Fairbanks and on Eielson Air Force Base are examples of the types of areas that produce northern pike for anglers. Other fisheries occur in lakes in the Kantishna River drainage (such as East Twin and Mucha lakes) and in clear boat-accessible sloughs, backwaters, and small tributaries off of the Tanana River. Fish Creek, a small drainage downriver on the Tanana River from Manley, produced a pike that held the State Record for many years. The northern pike present in the river system and in waters connected to the river provide the population reservoir which, through the movements of individual fish, ensures the continued viability of small stocks and availability of fishing opportunity wherever suitable habitat occurs. This includes the colonization of ponds. Northern pike colonize suitable gravel pits and other ponds either when the river floods them or the pits are connected to the river, or when people illegally introduce northern pike into those waters. Many of these areas are road-accessible. None of these produce large numbers of fish or very many large fish. It is not presently possible to develop a direct estimate of effort because of the mixed stock fisheries of which these pike fisheries are a part.

The wide range of accessibility for anglers, and the diversity of types of angling opportunity add value to these fisheries. Angler interest in road accessible northern pike fisheries is high. However, the nature of northern pike as a voraciously piscivourous top-level predator that takes the hook readily but requires many years to grow to the larger sizes valued by anglers makes it difficult to manage for high quality pike fisheries in roadside situations.

Abundance and age and sex composition studies were conducted in East Twin Lake in 1993 (Pearse 1994) and Deadman Lake in 1994 (Hansen and Pearse 1995). In both cases the populations were judged to be healthy and capable of sustaining existing harvest levels. A radiotelemetry study done in 1993 and 1994 in the Chena River indicated that adult northern pike in that river move little during the year, although difficulties with some aspects of the studies caused the results to be somewhat qualified (Pearse 1994).

Fishery Management and Performance

Management on a sustainable basis is an overriding obligation. However, in roadside ponds stocked with salmonids such as rainbow trout, where northern pike have been illegally introduced, maximum harvest rate (in excess of sustainability) is beneficial.

In 1992, northern pike fishing in lakes of the Tanana drainage was closed during all of April and May to protect pike just prior, during, and immediately after spawning. This closure was subsequently judged to be unnecessarily restrictive, and in 1997 the BOF adopted a revision leaving all lakes in the LTMA except Harding Lake open from June 1 through April 20.

Current Issues and/or Recommended Activities

The department will continue to monitor these small fisheries through the SWHS and assess trends which may indicate a fishery is getting higher use and may therefore warrant further research and/or management activities.

At the 2007 BOF meeting the Board will deliberate over Proposal 132 that seeks to create a regulation requiring that Tanana River drainage anglers keep their pike whole, until they reach their residence. This is proposed as a tool for enforcing length limits. There are currently no sport fisheries in Alaska where anglers are required to keep their fish whole until they reach their residence. The Department currently has EO authority stating that fisheries managers may require that fish remain whole for purposes of stock and/or harvest assessment; or, for enforcement.

Burbot

Tanana River

Background

The Tanana River is the second largest tributary of the Yukon River; it is approximately 570 miles long and is highly turbid in the summer due to glacial run-off. The largest Tanana River mainstem sport fishery is the winter burbot fishery. Burbot are members of the cod family (*Gadidae*), and are unique in the fact that they are active and spawn in the coldest part of winter when most other fish are in a torpor state.

Burbot are commonly caught through the ice using set-lines, on which up to 15 hooks may be used. In flowing waters of the Tanana River drainage the daily bag and possession limit for burbot is 15 fish/ day. Burbot stocks in the Tanana River system are harvested most heavily near population centers such as Fairbanks, North Pole, and Nenana.

Population assessments were conducted annually from the late 1980s through 1998 in the Lower Chena River and the Tanana River near Fairbanks, and they showed a population that was stable and was possibly increasing (Table 17; Evenson 1988, 1994, 1997; Stuby and Evenson 1999). Radiotelemetry studies on burbot have also been conducted. Extensive movements and exchange of burbot within the Tanana River drainage tends to minimize effects of concentrated local fishing effort, and overall stocks in the Tanana River appear to be lightly exploited (Evenson 1997).

While most of the effort in the Tanana River fishery is probably directed toward burbot, it can be difficult to make inferences about the burbot fisheries because they are mixed-species fisheries.

The SWHS bases its estimates on calendar years, which divide the winter fishery into two segments and assigns the first portion to the end of 1 year and the second portion to the beginning of the next. The impact of early winter weather conditions, timing of freeze-up, etc on effort are thus combined with those in the second part of the previous winter fishery. Anglers fish for burbot all winter, and casual observations indicate that effort increases as the ice becomes safer to travel on in November, declines in late December, and climbs again after mid-January. This decline coincides with the darkest, coldest time of the year, and with the general timing of burbot spawning in the rivers.

Prior to 1988 there was no bag and possession limit for burbot if taken by hook and line, there was a 10 fish/day limit if the fish were taken by spear or bow and arrow. In 1988 the current bag and possession limits went into effect: 15 fish/day in flowing waters, 5 fish/day in lakes.

Fishery Management and Performance

The estimated catch of burbot in the LTMA varies from year to year within a range of about 2,000 to 4,000 fish. The 5-year average total harvest of 1,944 fish is 72% of the total catch of 2,708 fish (Table 18), which is higher than any other fishery in the Tanana drainage, indicating the consumptive value of this fishery to Interior residents. The Tanana River and the Lower Chena River fisheries provide most of the catch and harvest in the LTMA (Table 18). These fisheries are on the same stock of burbot, which could be characterized as a "middle Tanana" stock.

Current Issues and/or Recommended Activities

A Tanana River Burbot Management Plan may be developed that sets thresholds for regulatory action if harvest rates change such that they appear to be unsustainable.

Other LTMA Burbot Fisheries

Background

Within the LTMA burbot also occur in the lower sections of clear tributaries such as the Lower Chatanika, Salcha, and Tolovana rivers, and in deeper lakes such as Harding Lake and West Twin Lake. They can also colonize suitable ponds and gravel pits when flooding from a nearby river occurs. Fishing occurs year-round, but the majority of the effort in the LTMA appears to occur in fall and winter. The most common gear type in flowing waters of the drainage is set lines, but hand held gear is used by anglers in lakes and to a certain extent in rivers.

Although exploitation rates of burbot in the Tanana River are not considered excessive, studies suggest low burbot abundance in most of the easily accessible lakes examined within the Tanana drainage. Population density of burbot in many lakes declined dramatically in the early 1980s due to unsustainable rates of sport fishing exploitation. More recent stock assessment studies conducted in lakes of the Tanana River drainage demonstrate the detrimental effects of long-term high exploitation rates on stocks (Lafferty et al. 1992). Such effects resulted in the restrictive regulations of no set lines allowed in Harding Lake and the burbot bag and possession limit is 2 fish/day. Set lines may be used in the other lakes of the LTMA; however, they may only be used from October 15 – May 15. The burbot bag and possession limit in all lakes of the LTMA (except Harding) is 5 fish/day.

Current Issues and/or Recommended Activities

The department will continue to monitor these small fisheries through the SWHS and assess trends which may indicate a fishery is getting higher use and may therefore warrant further research and/or management activities.

Whitefish

Chatanika River

Background

The Chatanika River supports a large spawning population of whitefish (humpback and least cisco). During late summer and fall, humpback whitefish and least cisco migrate up the Chatanika River to spawn in the middle section of the river between Hard Luck Creek and a few miles upstream of the Elliot Highway Bridge. They then move downriver to as yet undefined overwintering areas. It's quite possible that some of overwintering areas are outside of the Minto Flats complex. Fleming (1999) described the potential compound life history of the stocks, which might include long migrations in the Tanana and Yukon rivers. During the course of northern pike research, humpback whitefish and least ciscos have been observed moving into the Minto Lakes immediately after breakup. They likely feed for a period of time during the summer before moving on to spawning areas.

The only major sport fishery for whitefish in the LTMA was the spear fishery on the Chatanika River in the vicinity of the Elliot Highway Bridge. This fishery historically took place in September, while least cisco and humpback whitefish were migrating upstream to spawn. Both of these species were harvested, as were a small percentage of round whitefish. The fishery became very popular during the 1980s, and harvests had increased to 25,000 fish by 1987 (Table 19).

This fishery had no bag limit until 1988, when a 15 fish per day limit was implemented. Harvest decreased in 1988 after the bag limit was imposed, but increased again in 1989. The decline in humpback whitefish abundance from 41,211 fish in 1988 to 17,322 fish in 1989 (Table 20; Hallberg 1989; Timmons 1990) combined with harvest estimates that were considered unsustainable prompted the department to close the fishery by EO in October 1990, and again in September 1991 (Appendix A). In 1992, the BOF adopted a department proposal to limit the fishery to the month of September and to limit the area where the fishery took place to downstream of a point one mile above the Elliot Highway Bridge. During 1992, the department also adopted the Chatanika River Sport Fish Management Plan that set threshold abundance levels required to allow harvest. The threshold abundance level for humpback whitefish is 10,000 spawners, and the threshold abundance level for least cisco is 40,000 spawners.

Stock assessments done in 1992 and 1993 (Table 20; Fleming 1993, 1994) indicated abundance levels above the threshold levels in the management plan. However harvest rates in those years were very low and attributed to poor weather conditions during the peak of migration (Burr et al. 1998)

Stock assessment during 1994 (Fleming 1996) indicated that the abundance level of least cisco was below the management plan threshold allowing harvest; therefore the fishery was closed by EO in September 1994. The fishery remained closed by EO through 2001, when the BOF closed the spear fishery by regulation.

When the BOF closed the spear fishery, they established a hook and line fishery in the Chatanika River for whitefish, with a daily bag and possession limit of 5 fish. Least ciscos may not be retained in the hook and line fishery. There is little participation in this fishery due to the difficulty in catching whitefish by artificial lures.

There has been no population assessment performed since 1997, although interest remains high in the Fairbanks area for reestablishing a spear fishery.

Fishery Management and Performance

The whitefish fishery on the Chatanika River is currently managed under the multi-species Chatanika River Sport Fishery Management Plan which was written and adopted in 1992. The plan sets threshold abundance levels for both humpback whitefish and least cisco, below which no harvest is allowed, and a range of maximum exploitation rates depending on the threshold abundance for that species. The threshold abundance level for humpback whitefish is 10,000 spawners, and the maximum exploitation rate is from 10 to 15%. The threshold abundance level for least cisco is 40,000 spawners, and maximum exploitation rate is from 20% to 25%.

Current Issues and/or Recommended Activities

Alaska residents holding a sport fishing license may apply for a *Personal Use Whitefish and Sucker Permit* (5 AAC 77.190, 2005-06) which allows them to harvest whitefish with dip nets in the *Fairbanks Non-Subsistence Area* (5 AAC 99.015(a) (4), 2005-06). This change to the personal use permits occurred at the 2004 BOF meeting however few people have taken advantage of the opportunity to date. To apply for a permit, anglers must contact ADF&G Division of Commercial Fisheries in Fairbanks.

Complete stock assessment of whitefish has not been done on the Chatanika River since 1997. The most recent stock composition sample was collected during 2000. Research on whitefish stocks in the Chatanika River should be limited to estimating stock composition until there are indications that stocks may be rebuilding and an abundance estimate is needed to confirm the recovery.

At the 2007 BOF meeting the Board will deliberate over Proposals 138 and 139 that seek to reopen the Chatanika whitefish spear fishery under the auspices of the personal use regulations. A personal use whitefish fishery would be limited to Alaskan residents only, and fishers wanting to participate would be issued a permit that would state when and where spearing would be allowed and limit the number of fish that could be harvested.

Other LTMA Whitefish Fisheries

Background

Small harvests of whitefish are consistently reported in the SWHS from the Chena, Salcha, and Tanana rivers. These fisheries may involve hook-and-line angling and some spearing of fish migrating to spawning grounds in the fall. Round whitefish share a common habitat preference with grayling and are abundant in many areas where anglers fish for grayling. They are occasionally taken with rod and reel, as are humpback whitefish. Least ciscos rarely take a hook. Of the whitefish fisheries other than the Chatanika River, the Chena and Tanana rivers have accounted for the largest harvests of fish. Harvest after the late 1980s in the Chena River declined sharply when the use of bait on small hooks was prohibited in the Chena River as part

of a regulatory package protecting Arctic grayling. Given their wide distribution and low catch rate, whitefish are judged to be an underutilized resource at this time.

Fishery Management and Performance

Although it has been felt in the past that there was very little hook-and-line angling for whitefish in the LTMA, and that most harvests and effort involved spear fisheries, estimated catches in many cases are much higher than estimated harvests (Table 19). This may indicate that a substantial portion of the catch is caught with hook-and-line, and is subsequently released.

Current Issues and/or Recommended Activities

Anglers are encouraged to fish for whitefish and to look for other stocks that might provide opportunity for fall spear fishing. Because of ongoing interest, it is possible that new spear fisheries may emerge on small stocks of whitefish in some of the clearwater tributaries of the Tanana River, and reported harvest levels should be watched in future years, especially from those streams that are easily accessible. To date there has been little success at developing spear fisheries on other stocks.

Whitefish are highly migratory. In the Tanana and Yukon rivers there are subsistence and personal use fisheries. There is little information available describing the relationship between whitefish stocks available to and utilized by LTMA anglers and those utilized within other fisheries. Research projects should be developed and implemented to delineate the life history patterns of Tanana drainage whitefish.

Lake Trout

Harding Lake

Background

Although Harding Lake is closed to pike fishing, it does continue to support stocked lake trout and Arctic char/ Dolly Varden fisheries (Table 21). The first documented introduction of lake trout was 12 fish in 1939. Although there were plans to continue stocking lake trout through the 1940s plans were put on hold during Alaska's involvement in WWII. In 1963 lake trout stockings resumed in Harding Lake with 252 adults released that year, and 265 adults in 1965. These lake trout came from wild populations in Boulder, Two-bit and Monte lakes (Doxey 1991).

In mid-winter of 1965 approximately 88,000 eyed lake trout eggs were lowered through the ice on Harding Lake in wire hatching baskets. These eggs had been collected from Summit Lake and incubated to the eyed stage at the Fire Lake Hatchery. An estimated 75,000 eggs successfully hatched (Heckart and Roguski 1966). Fingerling lake trout were stocked in 1967 (31,200 fish) and again in 1990 (72,000 fish), subcatchables (~4 inches) were also stocked in 1990 (71,500 fish; Doxey 1991). From 1999-2001 approximately 4,000 catchable lake trout (~8 inches) were stocked each year (A. Behr, Stocked Waters Biologist, ADF&G, Fairbanks; personal communication)

The lake trout in Harding Lake are now naturally reproducing. A total of 16 individuals ranging in age from 2 to 11 years old were captured during surveys conducted between 1981 and 1984. This was the first solid evidence that the Harding Lake stocked lake trout were reproducing (Doxey 1982). After 1986 large lake trout that were captured during lake surveys were released

immediately so few age samples were collected. In 1998 artificial spawning substrate was placed in Harding Lake to enhance lake trout spawning habitat (T. Viavant, Sport Fish Biologist, ADF&G, Fairbanks; personal communication). Fish were observed to be using the substrate, although it is unclear what the success rate has been.

Fishery Management and Performance

Prior to 2004 the lake trout bag and possession limit on Harding Lake was 2 fish/ day and the fish had to be >18 inches in length. That regulation was changed in 2004 to a bag and possession limit of 1 fish/ day and the fish must be $\geq$ 26 inches in length. Harding Lake is managed under the Special Management category of the AYK Stocked Waters Management Plan.

The 5-year (2000-04) average lake trout catch is 457 fish with a harvest of 54 fish. The 2005 catch of 707 fish was 155% of the 5-year average and the harvest of 48 fish was 88% of the 5-year average (Table 21). Catches of lake trout on Harding Lake have been steadily increasing over the past 10 years, although the harvests have decreased.

Current Issues and/or Recommended Activities

The annual lake trout yield estimate from the Lake Area model for Harding Lake is 123 fish with a 26 inch minimum size limit (J. Burr, ADF&G, Sport Fish Biologist, Fairbanks; personal communication). Applying a 10% hooking mortality rate to the recent 5-year average catch (after the average harvest has been subtracted) and adding this to the 5-year average harvest a total mortality of approximately 94 lake trout can be assumed under current regulations, therefore it is likely that the lake trout population in Harding Lake cannot sustain a large increase in fishing pressure. In the future, an annual survey of spawners should be undertaken in September or early October to better assess the lake trout of Harding Lake.

At the 2007 BOF meeting the Board will deliberate over Proposal 129 that seeks to increase the minimum length limit from 26 to 36 inches for lake trout retained from Harding Lake. The annual lake trout yield estimate from the Lake Area model for Harding Lake is 123 fish with a 26-inch minimum size limit and 62 fish with a 36-inch minimum size limit. During 2000-2004, lake trout total mortality (harvest plus an estimated 10% hooking mortality applied to catch after harvest is subtracted) averaged 94 fish. It is unknown what level of the current harvest is above 36 inches, but based on recent trophy fish certificate records it is believed that annual harvest of fish this size is less than 10 fish.

The BOF will also deliberate over Proposal 137 that seeks to develop a regulatory regional lake trout management plan. If adopted, this proposal will provide regulatory guidelines to manage lake trout populations in the Arctic-Yukon-Kuskokwim (AYK) sport fish management areas. These guidelines are the same as adopted in 2005 for the Upper Copper Upper Susitna Management Area (UCUSMA). The plan would provide the Board of Fisheries with a consistent means to address proposals submitted by the public and Department. The management plan would set bag, possession, size limits, seasons, and methods and means for lake trout waters based upon current harvest levels and population data.

Other LTMA Lake Trout Fisheries

There are consistently small numbers of lake trout reported in some lakes in the LTMA. These fish are believed to be residual fish from past stocking events. Lake trout have not been stocked in the LTMA since 2001.

Stocked Waters

Background

The program of stocking hatchery produced fish to augment angling opportunity in Alaska began in 1952 when lakes along the road system near Fairbanks were stocked with rainbow trout and coho salmon. The first sport fish hatchery in Alaska (then the Territory of Alaska) was constructed at Birch Lake in 1952 and remained in operation until the 1960s. Subsequently hatcheries at Fire Lake, Ft. Richardson, Elmendorf AFB, Clear Air Force Station, and other locations supplied fish to LTMA waters. Presently the Ft. Richardson and Elmendorf hatcheries, located in Anchorage, are in operation and supply the stocked production for Interior Alaska.

Some initial stocking events were "bucket-biology" experiments where fish were simply transported from one lake to another, often without good documentation. Stocking Alaska's waterways has changed over the years and now there are restrictive policies in place which outline criteria determining where fish can be stocked, what species may be stocked and what brood stocks can be used. In addition, all the hatchery raised fish must undergo pathology testing to ensure they are disease-free before being stocked into any water bodies.

At present a total of 54 lakes may be stocked in the LTMA. They range in size from Harding Lake at about 2,500 acres to small urban ponds less than 1 acre in surface area. Piledriver Slough is the only stream stocked, with (sterile) rainbow trout. The stocked waters offer a range of fishing opportunities including neighborhood urban ponds, large and small roadside lakes, remote lakes that are only trail-accessible and sometimes only in winter, and a few remote lakes only accessible by airplane. Within the spectrum of fisheries management needs of the LTMA they function to provide additional and more diverse angling opportunity and to shift pressure from and provide harvest alternatives to wild stocks. Perhaps one of the most important aspects of the diversity provided is the major, sustainable opportunity for winter fishing.

A variety of fish may be currently stocked in the LTMA including rainbow trout, Arctic grayling, Arctic char/ Dolly Varden, Chinook and coho salmon. These fish are produced at the Anchorage hatcheries, transported by truck to Fairbanks and stocked in area lakes in the early summer and late fall. Occasionally lakes are stocked in the winter.

Fish have been stocked at four sizes: fingerling (2 grams), subcatchables (20 - 60 grams), catchables (100 - 200 grams) and surplus broodstock (rainbow trout only, up to 1500 grams). Size at stocking depends on management needs for the particular stocking location and hatchery production capability. For example, catchables are stocked in roadside and urban ponds because the angler use of such places produces demand far in excess of the production capacity of the pond to sustain the fishery with fingerling stockings. Conversely, fingerlings are stocked into remote lakes because those lakes have the productivity to meet the lower demand and it is too expensive to transport larger fish with aircraft.

Fishery Management and Performance

Fishing the stocked waters of the LTMA is very popular because the bag and possession limits are typically very liberal (10 fish, only 1 over 18 inches), and most of the lakes/ponds are easily accessible. Approximately 74% of the recent 5-year average annual LTMA sport harvest comes from the stocked lakes in the area (Table 22).

In 2004 the BOF adopted the *AYK Region Stocked Waters Management Plan* (5 AAC 70.065, 2005-06) into regulation. This plan defines how ADF&G should meet the public demand for diverse fishing opportunities. The plan defines three management approaches as: Regional, Conservative and Special. Specially managed lakes are managed to produce larger fish, although anglers may have a lower probability of catching those fish. Lakes in the LTMA that are in the special management category include: Harding, Little Harding and Summit (near Cantwell) lakes. Dune Lake is managed under the Conservative Management Approach. All remaining lakes in the LTMA are in the Regional Management Approach category.

The Region III general stocking plan is annually updated by stocked waters staff. The fish stocking plan is a comprehensive list of the species, the life stage, the stocking frequencies, and the maximum numbers of fish that can be stocked for all lakes in the stocking program. The projected numbers of fish to be stocked annually for a 5-year period are also listed in this report. The 2006 Region III stocking plan may be accessed via the internet at: http://www.sf.adfg.state.ak.us/statewide/hatchery/pdfs/06regioniii.pdf

Current Issues and/or Recommended Activities

The two Anchorage hatcheries (Ft. Richardson and Elmendorf AFB) are no longer producing as many fish as they once did due to changes to their boiler systems. These changes resulted in less hot water, which is necessary for accelerating the fish growth rates. In 2005 the Alaska legislature approved the construction of new hatcheries in both Fairbanks and Anchorage to replace the outdated Anchorage facilities. Funding has been secured and construction on the Fairbanks facility should begin in 2007 (Anchorage in 2008). Once the Fairbanks hatchery becomes operational, the biomass of fish stocked in the LTMA is predicted to double.

Due to concerns of reduced hatchery production Proposal 136 has been submitted to the BOF for the February 2007 meeting to reduce the regional management approach category from 10 fish, one fish 18” or greater to 5 fish, one 20” or greater. The intent of this proposal is to reduce harvest levels so not all large fish will be harvested from stocked lakes due to reduced stocking levels and to align stocked waters regulations statewide. The proposal is likely a response of an emergency order issued this summer for Anchorage area lakes which reduced the bag and possession limit in all stocked lakes for rainbow trout from 5 fish, one fish 20” or greater to 2 fish, one fish 20” or greater.

Proposal 131 is a housekeeping proposal submitted by the Department that is updating the regulation for stocked lakes with additions and deletions of stocked lakes which have been modified by the statewide stocking plan.

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TABLES AND FIGURES

Table 1.-Number of angler days of sport fishing effort expended by recreational anglers fishing LTMA waters, 1983-2005.

	Number of Days Fished				LTMA	
Year	Statewide	Region III	LTMA	LTMA % of Statewide	Number of Anglers	Number of Trips
1983	1,732,528	199,125	103,153	6%		
1984	1,866,837	199,041	95,942	5%	N/A	91,089
1985	1,943,068	186,883	83,942	4%	N/A	80,416
1986	2,071,412	194,713	94,436	5%	N/A	76,997
1987	2,152,866	217,109	104,861	5%	N/A	100,534
1988	2,311,291	233,559	120,205	5%	N/A	110,399
1989	2,264,079	239,626	131,992	6%	26,337	103,980
1990	2,453,284	245,629	129,910	5%	25,861	98,317
1991	2,456,328	219,922	106,604	4%	23,577	81,254
1992	2,540,374	181,852	81,378	3%	21,478	67,395
1993	2,559,408	220,972	103,713	4%	22,673	88,243
1994	2,719,911	239,626	99,906	4%	21,987	83,620
1995	2,787,670	270,141	141,231	5%	28,325	114,388
1996	2,006,528	201,166	159,027	8%	24,046	117,364
1997	2,079,514	238,856	89,911	4%	23,371	71,280
1998	1,856,976	227,841	81,789	4%	19,423	62,298
1999	2,499,152	304,522	114,592	5%	21,196	72,673
2000	2,627,805	241,574	87,451	3%	17,136	57,482
2001	2,261,941	194,138	63,702	3%	24,719	40,408
2002	2,259,091	220,276	78,499	3%	25,965	47,445
2003	2,219,398	206,705	71,052	3%	29,871	48,300
2004	2,473,961	217,041	90,530	4%	31,703	54,651
2005	2,463,929	183,535	64,891	3%	25,036	41,022
10-Yr Average 1994-2004	2,307,204	232,226	97,778	4%	24,575	68,629
5-Yr Average 2000-04	2,368,439	215,947	78,247	3%	25,879	49,657
2005 as % of 5-Yr Average	104%	85%	83%		97%	83%

Source: Data from (Mills 1979-1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006a-b, *In prep a-b*).

Table 2.-Total number of fish harvested by recreational anglers from LTMA waters, compared to Region III and Statewide Freshwater Harvest, 1983-2005.

Year	Statewide F/W Harvest	Region III Harvest	Region III Harvest as a % of Statewide Harvest	LTMA Harvest	LTMA Harvest as a % of Region III Harvest
1983	1,242,931	273,751	22%	109,547	40%
1984	1,310,626	245,083	19%	121,755	50%
1985	1,317,552	241,109	18%	105,453	44%
1986	1,245,380	216,826	17%	97,155	45%
1987	1,415,901	201,677	14%	90,174	45%
1988	1,457,934	264,371	18%	113,150	43%
1989	1,502,163	253,437	17%	119,605	47%
1990	1,185,603	174,175	15%	75,186	43%
1991	1,282,541	221,164	17%	83,237	38%
1992	1,213,618	131,486	11%	47,466	36%
1993	1,087,651	151,551	14%	63,490	42%
1994	1,063,871	152,676	14%	52,501	34%
1995	852,700	118,473	14%	59,741	50%
1996	1,073,281	156,333	15%	58,414	37%
1997	942,274	161,500	17%	45,676	28%
1998	976,926	165,771	17%	37,789	23%
1999	1,078,643	169,675	16%	45,216	27%
2000	1,218,307	174,144	14%	49,783	29%
2001	1,043,036	119,797	11%	26,587	22%
2002	1,109,901	164,463	15%	67,326	41%
2003	1,052,301	129,029	12%	39,058	30%
2004	1,185,153	140,292	12%	40,694	29%
2005	994,001	109,956	11%	27,342	25%
10 year Average 1995-2004	1,053,252	149,948	14%	47,028	32%
5-Year Average 2000-04	1,121,740	145,545	13%	44,690	30%
2005 as % of 5 Yr Average	89%	76%		61%	82%

Source: Data from (Mills 1979-1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, *In prep a-b*).

Table 3.–Abundance estimates and methodsd of estimation for Chinook salmon in the Chena, Salcha and Chatanika rivers, 1986-2006.

	Chena		Salcha		Chatanika	
Year	Abundance	Method	Abundance	Method	Abundance	Method
1986	9,065	M-R	-	-	-	-
1987	6,404	M-R	4,771	M-R	-	-
1988	3,346	M-R	4,562	M-R	-	-
1989	2,666	M-R	3,294	M-R	-	-
1990	5,603	M-R	10,728	M-R	-	-
1991	3,025	M-R	5,608	M-R	-	-
1992	5,230	M-R	7,862	M-R	-	-
1993	12,241	Tower	10,007	Tower	253	Boat Survey
1994	11,877	Tower	18,399	Tower	-	-
1995	9,680	M-R	13,643	Tower	444	Boat Survey
1996	7,153	M-R	7,570	M-R	198	Boat Survey
1997	13,390	Tower	18,514	Tower	3,809	M-R
1998	4,745	Tower	5,027	Tower	864	Tower
1999	6,485	Tower	9,198	Tower	503	Tower
2000	4,694	M-R	4,595	Tower	398	Tower
2001	9,696	Tower	13,328	Tower	964	Tower
2002	6,967	M-R	4,644	Tower	719	Tower
2003	8,739[a]	Tower	11,758 [b]	Tower	1,008	Tower
2004	9,645	Tower	15,761	Tower	2,444	Tower
2005	no estimate[c]	Tower	5,988	Tower	no estimate[c]	Tower
2006[d]	2,936	Tower	10,400	Tower	-	-
BEG Range	2,800 – 5,700		3,300 – 6,500		N/A	
10 year Average 1996-2005	7,946		9,638		1,212	
5-Year Average 2001-05	8,762		10,296		1,284	
2006 as % 5 Yr Average	34%		101%		-	

Source: Data from Barton (1987 and 1988); Barton and Conrad (1989); Burkholder (1991b); Evenson (1991-1993; 1995-1996); Evenson and Stuby (1997); Skaugstad (1988, 1989, 1990a, 1990b, 1992, 1993, and 1994); Stuby and Evenson (1998); Stuby (1999, 2000, 2001); Doxey (2004); Doxey et al. (2005); Brase and Doxey (2006), Brase (*In prep*).

Note: M-R = Mark Recapture experiment.

[a] Likely 11,100 Chinook salmon when expanded for non-counting days.

[b] Likely 15,500 Chinook salmon when expanded for non-counting days.

[c] No estimates were produced due to extreme high water events throughout run. Chena River Chinook salmon escapement was likely within the BEG range of 2,800 – 5,700 fish.

[d] Preliminary results.

Table 4.–Sport catch and harvest of Chinook salmon in the Chena, Salcha and Chatanika rivers, 1983-2005.

	Chena River		Salcha River		Chatanika River	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	31	N/A	808	N/A	147
1984	N/A	0	N/A	260	N/A	78
1985	N/A	37	N/A	871	N/A	373
1986	N/A	212	N/A	525	N/A	0
1987	N/A	195	N/A	244	N/A	21
1988	N/A	73	N/A	236	N/A	345
1989	N/A	375	N/A	231	N/A	231
1990	406	64	680	291	164	37
1991	258	110	515	373	181	82
1992	71	55	86	47	31	16
1993	2,545	733	1,788	601	625	192
1994	1,308	993	971	714	278	105
1995	1,095	662	4,091	1,448	134	58
1996	3,692	1,280	3,298	1,136	1,331	548
1997	3,186	1,039	2,639	719	336	175
1998	779	299	549	121	30	6
1999	2,004	442	1,237	445	63	63
2000	222	71	197	72	0	0
2001	1,579	536	707	108	55	23
2002	1,920	178	1,157	269	86	0
2003	3,012	976	3,752	1,127	13	13
2004	4,571	762	1,514	481	168	37
2005	503	57	582	351	12	0
10 Year Average 1995-2004	2,206	625	1,914	593	222	92
5-Year Average 2000-04	2,261	505	1,465	411	64	15
2005 as % 5-Year Average	22%	11%	40%	85%	19%	-

Source: Data from Mills 1979–1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, *In prep a-b*.

Table 5.-Number of salmon commercially harvested in the Yukon and Tanana rivers, 1995 - 2006.

	Total Yukon River (includes Tanana)				Tanana River Portion			
Year	Chinook	Summer Chum	Fall Chum	Coho	Chinook	Summer Chum	Fall Chum	Coho
1995	126,204	824,487	284,178	47,206	2,747	37,428	74,117	6,900
1996	91,890	689,542	107,347	57,710	447	46,890	17,574	7,142
1997	116,421	230,842	59,054	35,818	2,728	25,287	0	0
1998	44,625	31,817	0	1	963	570	0	0
1999	70,767	29,412	20,371	1,601	690	148	0	0
2000	9,115	7,272	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	24,880	13,785	0	0	1,066	3,218	0	0
2003	40,664	10,685	10,996	25,243	1,813	4,461	4,095	15,119
2004	56,168	26,410	3,729	19,993	2,057	6,610	3,450	18,649
2005	32,339	41,398	178,987	58,311	453	8,986	49,637	21,778
2006[a]	46,359	92,870	167,993	62,995	84	44,621	23,353	11,137

Source: Data from JTC 2006; B. Busher, Commercial Fish Biologist, ADF&G, Fairbanks; personal communication.

[a] Data are preliminary.

Table 6.-Number of salmon harvested in subsistence and personal use fisheries in the Yukon and Tanana rivers, 1995–2006.

	Total Yukon River (includes Tanana)				Tanana River Portion			
Year	Chinook	Summer Chum	Fall Chum	Coho	Chinook	Summer Chum	Fall Chum	Coho
1995	48,934	119,503	131,369	28,642	2,178	12,441	50,031	19,219
1996	43,521	103,408	129,222	30,510	1,392	8,391	36,832	15,091
1997	56,291	97,500	95,425	24,295	3,025	4,215	19,834	11,945
1998	54,090	86,088	62,869	17,781	2,276	6,088	14,372	7,481
1999	52,525	70,705	89,998	20,970	1,955	3,036	15,733	9,547
2000	35,916	64,925	19,307	14,717	1,058	1,141	311	5,150
2001	53,059	58,385	35,154	21,654	2,449	558	3,536	9,000
2002	42,746	72,435	19,393	15,261	1,193	687	3,205	9,519
2003	55,313	68,452	57,178	24,129	2,349	3,062	13,380	10,912
2004	53,876	69,903	62,436	20,965	1,589	2,024	9,183	11,817
2005[a]	52,827	78,914	90,340	25,991	2,169	2,133	23,940	20,169
2006	----------Not Available----------							

Source: Data from JTC 2006; B. Busher, Commercial Fish Biologist, ADF&G, Fairbanks; personal communication.
[a] Data are preliminary.

Table 7.–Coho salmon escapement estimates from the Nenana River drainage 1974-2006.

Year	Lost Slough[a]	Nenana Mainstem (Teklanika)[a,b]	Julius Creek[a]	Wood (Otter) Creek[a]	Clear Creek[a]	Glacier Creek[a]	Seventeen Slough[a]	Lignite Springs[c]	June Creek[c]	Total
1974	1,388						27			
1975	943						956			
1976	118						281			
1977	524			310[c]			1,167			
1978	350			300[c]			466			
1979	227						1,987			
1980	499			1,603[c]			592			
1981	274			849[d, e]			1,005			
1982				1,436[d, e]						
1983	766			1,042[d]			103			
1984	2,677			8,826[d]						
1985	1,584			4,470[d]			2,081			
1986	794			1,664[d]			218[f]			
1987	2,511			2,387[d]			3,802			
1988	348			2,046[d]						
1989				412[d]			824			
1990	688	1,308					15			
1991	564	447					52			
1992	372						490			
1993	484	419		666[d, g]			581			2,150
1994	944	1,648		1,317[d, h]			2,909	244		7,062

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Year	Lost Slough[a]	Nenana Mainstem (Teklanika)[a,b]	Julius Creek[a]	Wood (Otter) Creek[a]	Clear Creek[a]	Glacier Creek[a]	Seventeen Slough[a]	Lignite Springs[c]	June Creek[c]	Total
1995	4,169	2,218		500[d]			2,972			9,859
1996	2,040	2,171	5	201[i, j]	2,830	2,181	3,668[f]	282	0	13,378
1997	1,524[k]	1,446	0	[i, j]	2,200	1,464	1,996	50[d]	51	8,731
1998	1,360[i]	2,771[i]	0	370[k, m]	30	345	1,413[l]	175[d]	25	6,489
1999	1,002[i]	745[i]		[m]			662[i]			
2000	55[i]	66[i]	370	[m]	385	100	879[i]	95	120	2,070
2001	242	855	6	699	962	216	3,741	135	148	7,004
2002	0	328	15	935	216	42	1,910	130	95	3,671
2003	85	658	1	3,055	135	62	4,535	67	74[i]	8,672
2004	220	450	280	840	148	90	3,370	91	85[i]	5,574
2005	430	325	280	1,030	85	70	3,890	378	201[i]	6,639
2006	194	160	0	634	972	14	1,916	168	66[i]	4,124

Source: Data from US/Canada Yukon River Panel Joint Technical Committee (JTC 2006) and Chris Stark, BSFA Biologist; personal communication.

[a] Aerial survey, fixed winged (1974 – 1998) or helicopter (1999 – current), unless otherwise noted.
[b] Mainstem Nenana River between confluence's of Lost Slough and Teklanika River.
[c] Foot survey, unless otherwise noted.
[d] Weir count.
[e] Coho weir was operated at the mouth of Clear Creek (Shores Landing).
[f] Boat survey.
[g] Weir project terminated on October 4, 1993. Weir normally operated until mid to late October.
[h] Weir project terminated September 27, 1994. Weir normally operated until mid-October.
[i] Poor survey.
[j] Beginning at confluence of Clear Creek, the survey includes counts of both Glacier and Wood creeks to their headwaters.
[k] Survey of western floodplain only.
[l] Combination foot and boat survey.
[m] No survey due to obstructions in creek.

Table 8.–Sport catch and harvest of coho salmon in the LTMA, 1983-2005.

	Nenana River Drainage		Other Rivers		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	N/A	N/A	0	N/A	84
1984	N/A	N/A	N/A	33	N/A	158
1985	N/A	N/A	N/A	25	N/A	25
1986	N/A	N/A	N/A	460	N/A	281
1987	N/A	0	N/A	0	N/A	0
1988	N/A	255	N/A	206	N/A	461
1989	N/A	192	N/A	288	N/A	493
1990	664	261	24	8	688	269
1991	1,679	222	221	221	1,900	443
1992	583	89	177	109	760	198
1993	0	0	291	29	291	29
1994	720	440	226	99	946	539
1995	114	77	1,016	516	1,130	593
1996	775	149	1,186	199	1,961	348
1997	767	179	497	163	1,264	342
1998	422	119	128	6	550	125
1999	142	33	109	100	251	133
2000	124	6	323	34	447	40
2001	739	118	153	62	892	180
2002	98	24	120	0	218	24
2003	461	11	172	0	633	11
2004	1,046	78	360	106	1,406	184
2005	0	0	14	0	14	0
10 Year Average 1995-2004	469	79	406	119	875	198
5-Year Average 2000-04	494	47	226	40	719	88
2005 as % of 5-Year Average	-	-	6%	-	2%	-

Source: Data from (Mills 1979–1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, *In prep a-b*).

Table 9.-Estimated abundance of Arctic grayling by size (stock size (150-269mm) vs. quality and larger (>270mm)) and by river section of the Chena River, 1985 – 1998, 2005.

	Lower River (below RM45)		Upper River (RM 45-90)			
Year	150-269mm	≥270mm	150-269mm	≥270mm	Total Abundance[a]	SE
1985	-	-	-	-	112,391	N/A
1986	-	-	-	-	61,581	26,987
1987	-	-	-	-	31,502	3,500
1988	-	-	-	-	22,204	2,092
1989	-	-	-	-	19,028	1,542
1990	-	-	-	-	31,815	4,880
1991	5,100	1,426	14,513	5,717	26,756	2,547
1992	9,394	1,921	13,495	4,538	29,348	2,055
1993	10,514	1,533	20,694	6,877	39,618	4,289
1994	14,200	2,335	21,239	6,601	44,375	2,647
1995	14,150	2,059	21,660	7,276	45,145	3,852
1996	11,863	2,780	15,611	11,209	41,463	3,363
1997[b]	10,205	2,044	-	9,458	≥26,000[c]	2,916
1998[b]	7,212	1,804	6,028	12,519	27,563	2,459
2005	4,854	2,196	14,764	5,253	27,750	3,658
Management Objective		2,200		8,500		

Source: Data from Holmes et al. 1986; Clark and Ridder 1987a, 1988; Clark 1989, 1990, 1991, 1993, 1994, 1995, 1996; Ridder and Fleming 1997; Ridder 1998, 1999; K. Wuttig, Sport Fish Biologist, ADF&G, Fairbanks; personal communication.

[a] Total abundance is for fish ≥ 150 mm FL unless otherwise indicated.

[b] One boat used to fish the upper section.

[c] Abundance estimate does not include fish 150 to 239 mm FL for the upper section.

Table 10.–Sport catch and harvest of Arctic grayling in the LTMA, 1977 – 2005.

Year	Chena River		Piledriver Slough		Salcha River		Chatanika River		Nenana River Drainage[a]		Total Grayling[b]	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977	N/A	21,723	N/A	N/A	N/A	6,387	N/A	6,737	N/A	N/A	N/A	N/A
1978	N/A	33,330	N/A	N/A	N/A	9,067	N/A	9,284	N/A	N/A	N/A	N/A
1979	N/A	27,977	N/A	N/A	N/A	5,980	N/A	6,121	N/A	N/A	N/A	N/A
1980	N/A	41,825	N/A	N/A	N/A	5,351	N/A	5,143	N/A	N/A	N/A	N/A
1981	N/A	27,548	N/A	N/A	N/A	3,983	N/A	3,808	N/A	N/A	N/A	N/A
1982	N/A	29,318	N/A	N/A	N/A	6,843	N/A	6,445	N/A	N/A	N/A	N/A
1983	N/A	18,729	N/A	5,822	N/A	9,640	N/A	9,766	N/A	N/A	N/A	60,748
1984	N/A	27,077	N/A	3,751	N/A	13,305	N/A	4,180	N/A	N/A	N/A	61,560
1985	N/A	6,240	N/A	N/A	N/A	5,826	N/A	7,404	N/A	3,676	N/A	37,611
1986	N/A	7,862	N/A	2,312	N/A	7,540	N/A	2,692	N/A	748	N/A	30,398
1987	N/A	2,681	N/A	4,907	N/A	4,762	N/A	5,619	N/A	1,003	N/A	24,723
1988	N/A	4,532	N/A	8,095	N/A	2,383	N/A	8,640	N/A	3,456	N/A	36,489
1989	N/A	12,635	N/A	4,459	N/A	5,721	N/A	6,934	N/A	1,403	N/A	39,407
1990	32,831	4,507	38,480	2,380	8,609	1,992	17,960	4,237	5,114	1,064	122,342	17,732
1991	29,548	3,719	20,815	3,987	4,697	1,688	12,830	2,642	5,419	2,079	98,562	18,503
1992	21,196	0	15,252	1,030	8,265	1,592	11,750	1,751	6,109	1,368	78,820	8,275
1993	44,033	0	32,036	759	11,254	1,768	14,283	2,001	7,137	907	127,383	11,377
1994	60,539	114	31,324	57	9,995	2,308	24,750	2,659	8,357	1,834	171,968	11,826
1995	39,816	212	17,431	0	12,173	2,685	15,859	2,108	7,288	1,170	108,325	13,217
1996	50,083	0	16,667	0	10,327	1,747	11,928	420	6,146	628	123,971	5,073

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Year	Chena River		Piledriver Slough		Salcha River		Chatanika River		Nenana River Drainage[a]		Total Grayling[b]	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1997	98,628	0	24,585	0	27,307	2,959	24,484	1,550	7,248	1,881	204,338	8,598
1998	87,243	0	24,203	0	18,829	2,179	14,384	915	9,468	483	179,855	5,914
1999	86,220	0	19,571	0	13,932	1,524	13,851	1,462	1,868	383	157,762	6,729
2000	43,844	0	7,224	0	7,200	1,544	9,204	773	638	297	92,462	4,829
2001	35,881	0	4,927	0	5,831	602	3,002	317	2,146	142	71,227	2,692
2002	51,065	0	8,199	32	7,532	1,287	15,313	1,357	7,113	982	119,845	11,101
2003	36,098	0	6,037	0	6,756	1,225	13,178	955	4,425	697	88,242	5,416
2004	55,376	0	4,789	0	7,355	1,501	8,729	583	6,197	716	99,851	4,144
2005	31,026	0	3,962	0	6,525	806	9,326	607	4,487	1,619	74,070	5,397
10 year Average 1995-2004	58,425	21	13,363	3	11,724	1,725	12,993	1,044	5,254	738	124,588	6,771
5-Year Average 2000-04	44,453	-	6,235	6	6,935	1,232	9,885	797	4,104	567	94,325	5,636
2005 as % of 5 Yr Average	70%	-	64%	-	94%	65%	94%	76%	109%	286%	79%	96%

Source: Data from Mills 1979-1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, *In prep a-b*.

[a] Includes Brushkana Creek.

[b] Includes stocked Arctic grayling.

Table 11.-Abundance estimates of Arctic grayling (N) for the 38.6 km lower Salcha River (bridge to river kilometer 40) during mid to late June 1988 – 1994, 2004.

Year	N (SE)	Size (mm FL)	Date	N (SE)	Size (mm FL)
1988[a]	2,181 (542)	≥150	May 24 – June 8		
1989	6,935 (766)	≥150	June 12 – 20		
1990	5,792 (659)	≥150	June 19 – 27		
1991	5,429 (1,044)	≥150	June 18 – July 2	4,182 (907)	> 199
1992			June 15 – 25	7,076 (2,555)	> 199
1993	15,950 (2,442)	≥150	June 7 – 17		
1994	14,562 (1,762)	≥150	June 13 – 30	5,774 (1,002)	> 235
2004[b]			June 29 – July 15	2,170 (429)	≥ 260

Source: Data from Clark and Ridder (1987b, 1988, 1990); Clark et al. (1991); Ridder et al. (1993); Roach (1994, 1995); and, A. Gryska, Sport Fish Biologist, ADF&G, Fairbanks; personal communication.

[a] Sample section in 1988 was 16 km long.

[b] Preliminary results.

Table 12.–Densities of Arctic grayling in select sections of the Chatanika River, 1972, 1981, 1984-85, 1990-95, 2002.

Year	Sampling Area	Grayling Density	Confidence[a]
1972	Elliott Hwy Bridge	305 fish/ km	Low
1981	Elliott Hwy Bridge	169 fish/ km	132-197 fish/ km
1984	Elliott Hwy Bridge	242 fish/ km	172-352 fish/ km
1985	Elliott Hwy Bridge	117 fish/ km	82-176 fish/ km
1990	28.8 km section from 7.5 km above the Elliott Hwy Bridge downstream to Any Creek	670 fish/ km	SE = 111 fish/ km
1991	35.2 km section from 9.6 km above the Elliott Hwy Bridge downstream to Any Creek	312 fish/ km	SE = 62 fish/ km
	73.8 km section from Any Creek to Murphy Dome Rd extension	271 fish/ km	SE = 52 fish/ km
1992	29.6 km section from 3.2 km above the Elliott Hwy Bridge downstream to Any Creek	271 fish/ km	SE = 47 fish/ km
	73.8 km section from Any Creek to Murphy Dome Rd extension	158 fish/ km	SE = 17 fish/ km
1993	29.6 km section from 3.2 km above the Elliott Hwy Bridge downstream to Any Creek	252 fish/ km	SE = 41 fish/ km
	50 km section from Any Creek to 16 km above Murphy Dome Rd extension	89 fish/ km	SE = 9 fish/ km
1994	29.6 km section from 3.2 km above the Elliott Hwy Bridge downstream to Any Creek	201 fish/ km	SE = 28 fish/ km
1995	37.8 km section from 3.2 km above the Elliott Hwy Bridge to 8.2 km below Any Creek	236 fish $\geq$ 150mm / km	SE = 21 fish/ km
		87 fish $\geq$ 270mm / km	SE = 9 fish/ km
2002	18.3 km section located between Sourdough and Perhaps creeks (Steese Hwy)	34 fish 160–249 mm/ km	SE = 17 fish/ km
		13 fish $\geq$ 250mm / km	SE = 3 fish/ km

Source: Data from Tack (1973), Holmes (1983, 1985), Holmes et al. (1986), Clark et al. (1991), Fleming et al. (1992), Ridder et al. (1993), Roach (1994, 1995), Fish (1996), and Wuttig (2004).

[a] Confidence is provided as a crude measure of precision (i.e., "Low"), the 95% confidence interval based on a Poisson distribution of recaptures (Ricker 1975) or the standard error.

Table 13.–Sport catch and harvest of northern pike in Minto Flats, the entire Minto Flats Complex (includes Minto Flats and lower Chatanika River), and the overall LTMA, 1983-2005.

	Minto Flats		Minto Flats Complex[a]		LTMA Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	2,748	N/A	3,461	N/A	7,898
1984	N/A	2,453	N/A	3,128	N/A	6,357
1985	N/A	4,146	N/A	5,256	N/A	8,224
1986	N/A	4,927	N/A	6,488	N/A	8,112
1987	N/A	1,781	N/A	2,401	N/A	6,105
1988	N/A	1,492	N/A	1,965	N/A	7,599
1989	N/A	1,734	N/A	2,596	N/A	8,310
1990	4,946	1,570	6,060	2,009	23,964	5,414
1991	5,427	2,155	6,111	2,586	23,037	9,426
1992	6,175	1,299	6,585	1,325	24,477	4,200
1993	19,536	2,076	24,378	3,420	41,809	7,743
1994	47,248	8,438	52,191	9,489	76,372	13,200
1995	21,823	3,126	29,193	4,480	43,578	10,581
1996	12,495	2,078	16,479	2,716	34,867	4,890
1997	9,932	1,074	11,253	1,246	19,816	2,320
1998	4,105	731	4,704	772	12,964	2,003
1999	3,261	908	3,636	1,098	10,641	2,013
2000	1,402	266	1,784	390	13,585	2,793
2001	2,849	641	2,916	654	13,117	3,296
2002	8,806	483	10,085	650	19,646	3,043
2003	8,706	1,260	12,997	1,284	20,150	2,033
2004	19,205	1,199	21,159	1,390	31,172	4,259
2005	14,839	1,880	16,768	2,052	26,171	3,319
10 year Average 1995-2004	9,258	1,177	11,421	1,468	21,954	3,723
5-Year Average 2000-04	8,194	770	9,788	874	19,534	3,085
2005 as % of 5 Yr Average	181%	244%	171%	235%	134%	108%

Source: Catch and harvest data from Mills (1979–1994); Howe et al. (1995, 1996, 2001a-d; Walker et al. (2003); and, Jennings et al. (2004, 2006 a-b, *In prep a-b*).

[a] Includes Minto Flats, Tolovana River and the lower Chatanika River.

Table 14.–Estimated northern pike abundance in Minto Lakes, 1987-2003.

	≥ 400mm		≥ 525 mm		≥ 600mm	
Year	Abundance	SE	Abundance	SE	Abundance	SE
1987	N/A	N/A	11,257	3,075	N/A	N/A
1988	N/A	N/A	13,233	3,143	N/A	N/A
1990	N/A	N/A	27,418	6,800	N/A	N/A
1991	N/A	N/A	17,633	5,480	N/A	N/A
1996	23,850	7,799	20,695	6,765	7,616	883
1997	16,547	1,754	14,639	1,552	3,251	174
2000	N/A	N/A	N/A	N/A	5,331	1,152
2003	25,227	4,529	13,900	2,918	7,683	2,347

Source: Data from Burkholder (1989, 1990); Hansen and Burkholder (1992); Roach (1997b, 1998b); and, Scanlon (2001, *In prep*).

Table 15.–Number of subsistence permit holders that reported fishing and the total subsistence harvest of northern pike in the Tolovana River drainage, 1994-2005.

Year	Number of Permits	Total Harvest
1994	24	995
1995	20	1,023
1996	24	1,616
1997	41	1,344
1998	32	431
1999	24	400
2000	13	352
2001	19	214
2002	13	521
2003	57	966
2004	42	393
2005	32	374
5-Year Average (2000-2004)	29	490

Source: Data from Busher et al. (*In prep*).

Table 16.–Abundance of northern pike > 300 mm fork length (SE in parentheses), sport catch and harvests of pike and water levels at Harding Lake, 1985-2005.

Year	Estimated Abundance	Water Level (ft ASL)[a]	Catch	Harvest
1985	NS	719.0	NA	503
1986	NS	718.5	NA	673
1987	NS	717.8	NA	1,886
1988	NS	717.8	NA	2,092
1989	NS	717.8	NA	1,764
1990	2,285 (430)	717.8	3,629	591
1991	2,308 (563)	717.8	5,071	1,888
1992	2,868 (353)	717.8	3,400	341
1993	3,765 (432)	717.0	8,471	391
1994	NS	716.5	5,559	539
1995	2,338 (411)	716.5	3,852	502
1996	3,377 (915)	717.0	4,070	363
1997	1,780 (355)	716.5	1,665	62
1998	1,376 (279)	716.0	1,425	139
1999	583 (76)	715.8	828	38
2000	NS	715.6	396	24[b]
2001	NS	715.8	Fishery closed	
2002	NS	715.6	Fishery closed	
2003	NS	715.5	Fishery closed	
2004	NS	715.3	Fishery closed	
2005	NS	715.0	Fishery closed	
	Average 1990-1999 (prior to pike closure)		3,797	486

Source: Catch and harvest data from Mills (1996–1994); Howe et al. (1995, 1996, 2001a-d); Walker et al. 2003).

Note: NS = No survey was performed in these years, data from: Burkholder (1991a); Skaugstad and Burkholder (1992); Pearse (1994); Roach (1996 1997a, 1998a); Roach and McIntyre (1999); and, Scanlon and Roach (2000).

[a] Lake water levels were estimated from engineering surveys, photographs and anecdotal evidence.

[b] Fishery was closed in the summer, so harvest was attributed to the winter fishery.

Table 17.–Catch-age estimates of total and exploitable abundances of Tanana River burbot, 1987-1998.

Year	Total Abundance	cv	Total Exploitable Abundance	cv
1987	281,255	0.155	77,877	0.168
1988	262,542	0.161	74,591	0.167
1989	242,706	0.170	73,246	0.163
1990	226,347	0.175	70,345	0.162
1991	198,666	0.178	67,714	0.164
1992	157,388	0.177	62,774	0.163
1993	153,969	0.206	56,227	0.173
1994	148,921	0.239	48,976	0.179
1995	176,044	0.308	43,420	0.194
1996	273,975	0.430	41,514	0.213
1997	402,186	0.489	52,168	0.244
1998	578,153	0.563	69,024	0.282

Source: Data from Evenson (1988, 1994) and Stuby and Evenson (1999).

Table 18.–Sport catch and harvest of burbot in the LTMA, 1983-2005.

	Tanana River		Chena River		Other[a]		Total LTMA	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	1,652	N/A	1,055	N/A	608	N/A	3,315
1984	N/A	1,210	N/A	1,233	N/A	688	N/A	3,131
1985	N/A	860	N/A	2,065	N/A	606	N/A	3,531
1986	N/A	1,236	N/A	884	N/A	957	N/A	3,077
1987	N/A	1,302	N/A	149	N/A	755	N/A	2,206
1988	N/A	1,335	N/A	386	N/A	183	N/A	1,904
1989	N/A	1,301	N/A	1,322	N/A	340	N/A	2,963
1990	961	838	338	304	1,402	1,065	2,701	2,207
1991	857	683	609	225	454	415	1,920	1,323
1992	1,323	981	1,235	1,032	406	355	2,964	2,368
1993	1,814	1,635	1,328	1,135	1,022	777	4,164	3,547
1994	2,063	1,626	685	592	406	333	3,154	2,551
1995	2,120	1,684	1,045	597	948	655	4,113	2,936
1996	818	537	540	441	577	400	1,935	1,378
1997	3,032	2,437	1,018	703	885	684	4,935	3,824
1998	1,262	876	1,144	854	426	358	2,832	2,088
1999	1,521	1,328	657	350	1,017	371	3,195	2,049
2000	1,442	936	1,236	702	634	394	3,312	2,032
2001	919	508	281	230	65	21	1,265	759
2002	1,632	1,283	83	58	1,656	1,446	3,371	2,787
2003	1,092	758	573	487	186	127	1,851	1,372
2004	1,616	1,228	1,977	1,433	150	110	3,743	2,771
2005	1,420	1,129	310	248	126	89	1,856	1,466
10 Year Average 1995-2004	1,545	1,158	855	586	654	457	3,055	2,200
5-Year Average 2000-04	1,340	943	830	582	538	420	2,708	1,944
2005 as % 5 Yr Average	106%	120%	37%	43%	23%	21%	69%	75%

Source: Data from Mills (1979–1994); Howe et al. (1995, 1996, 2001a-d; Walker et al. (2003); Jennings et al. (2004, 2006 a-b, *In prep a-b*).

[a] Other includes: Harding Lake, Chatanika River, Piledriver Slough, Nenana River, Minto Flats and other systems where sport anglers occasionally catch and/or harvest small numbers of burbot.

Table 19.–Sport catch and harvest of whitefish in the LTMA, 1983–2005.

	Chatanika River		Other Locations		LTMA Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	5,895	N/A	1,541	N/A	7,436
1984	N/A	9,268	N/A	1,204	N/A	10,472
1985	N/A	14,350	N/A	4,130	N/A	18,480
1986	N/A	22,038	N/A	4,957	N/A	26,995
1987	N/A	25,074	N/A	863	N/A	25,937
1988	N/A	7,983	N/A	1,140	N/A	9,123
1989	N/A	15,542	N/A	1,146	N/A	16,688
1990	5,334	5,216	2,680	1,083	8,014	6,299
1991	23	0	528	356	551	356
1992	2,033	2,033	1,107	777	3,140	2,810
1993	558	558	390	164	948	722
1994	436	97	1,241	145	1,677	242
1995	71	9	1,116	569	1,187	578
1996	320	46	340	103	660	149
1997	95	24	1,309	749	1,404	773
1998	60	0	1,055	490	1,115	490
1999	14	0	962	219	976	219
2000	361	0	486	313	847	313
2001	245	0	638	221	883	221
2002	181	28	1,066	908	1,247	936
2003	607	152	134	15	741	167
2004	196	45	1,319	1,199	1,515	1,244
2005	16	0	211	54	227	54
10 Year Average 1995-2004	215	30	843	479	1,058	509
5-Year Average 2000-04	318	45	729	531	1,047	576
2005 as % 5-Year Average	5%	-	29%	10%	22%	9%

Source: Catch and harvest data from (Mills 1979–1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003; Jennings et al. 2004, 2006 a-b, *In prep a-b*).

Table 20.-Humpback whitefish and least cisco abundance estimates from the Chatanika River, 1988–1997.

Year	Humpback Whitefish	Least Cisco
1988	41,211 (SE = 5,155)	N/A
1989	17,322 (SE = 1,655)	53,409 (SE = 5,110)
1990	No Survey	
1991[a]	15,313 (SE = 2,078)	135,065 (SE = 24,513)
1992	19,187 (SE = 1,617)	75,035 (SE = 8,555)
1993	13,112 (SE = 1,096)	46,562 (SE = 5,971)
1994	12,700 (SE = 1,138)	27,639 (SE = 3,211)
1995	No Survey	
1996	No Survey	
1997	16,107 (SE = 1,260)	22,811 (SE = 4,496)

Source: Data from Hallberg (1989); Timmons (1990, 1991); Fleming (1993, 1994, 1996, 1997).
Note: N/A = data not available.
[a] Estimates are for humpback whitefish > 359 mm, and least cisco > 289 mm.

Table 21.–Sport catch and harvest of lake trout and Arctic char/ Dolly Varden in Harding Lake, 1984-2005.

Year	Lake Trout		Arctic Char/ Dolly Varden	
	Catch	Harvest	Catch	Harvest
1984	N/A	0		
1985	N/A	0		
1986	N/A	24		
1987	N/A	0		
1988	N/A	55	First Stocked	
1989	N/A	119	N/A	141
1990	186	51	996	304
1991	148	133	2,076	450
1992	517	200	1,401	508
1993	438	132	195	107
1994	280	66	108	72
1995	258	177	1,610	245
1996	556	121	1,801	405
1997	462	90	1,375	257
1998	311	44	865	331
1999	807	89	2,535	645
2000	258	67	1,460	66
2001	435	44	798	205
2002	597	48	2,543	1,341
2003	518	41	900	336
2004	479	72	2,461	354
2005	707	48	555	151
10 Year Average 1995-2004	468	79	1,635	419
5-Year Average 2000-04	457	54	1,632	460
2005 as % or 5-Year Average	155%	88%	34%	33%

Source: Catch and harvest data from Mills (1979–1994); Howe et al. (1995, 1996, 2001a-d); Walker et al. (2003); Jennings et al. (2004, 2006 a-b, *In prep a-b*).

Table 22.–Contribution of stocked fish to the LTMA total catch and harvest, 1990 – 2005.

Year	All Stocked Species[a]		LTMA Total		Stocked as a % of LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	113,918	43,414	269,361	75,186	42%	58%
1991	106,938	52,888	229,970	83,237	47%	64%
1992	85,757	29,374	192,594	47,466	45%	62%
1993	110,630	38,390	282,500	63,490	39%	60%
1994	87,408	24,465	325,269	52,501	27%	47%
1995	84,382	24,754	239,737	59,741	35%	41%
1996	147,958	42,036	316,837	58,414	47%	72%
1997	97,095	27,840	327,712	45,676	30%	61%
1998	101,743	27,741	287,586	37,789	35%	73%
1999	107,840	34,186	276,123	45,216	39%	76%
2000	134,650	39,778	236,191	49,783	57%	80%
2001	63,634	19,245	147,597	26,587	43%	72%
2002	124,509	53,880	259,165	67,326	48%	80%
2003	89,559	25,414	196,310	39,058	46%	65%
2004	84,661	26,873	222,205	40,694	38%	66%
2005	55,427	16,567	151,367	27,342	42%	71%
10-Yr Average: 1995-2004	103,603	32,175	250,946	47,028	41%	68%
5-Yr Average: 2000-04	99,403	33,038	212,294	44,690	47%	74%
2005 as a % of 5-Year Average	56%	50%	71%	61%	79%	88%

Source: Catch and harvest data from Mills (1979–1994); Howe et al. (1995, 1996, 2001a-d); Walker et al. (2003); and, Jennings et al. (2004, 2006 a-b, *In prep a-b*).

[a] Data from: A. Behr, Stocked Waters Biologist, ADF&G, Fairbanks; personal communication.

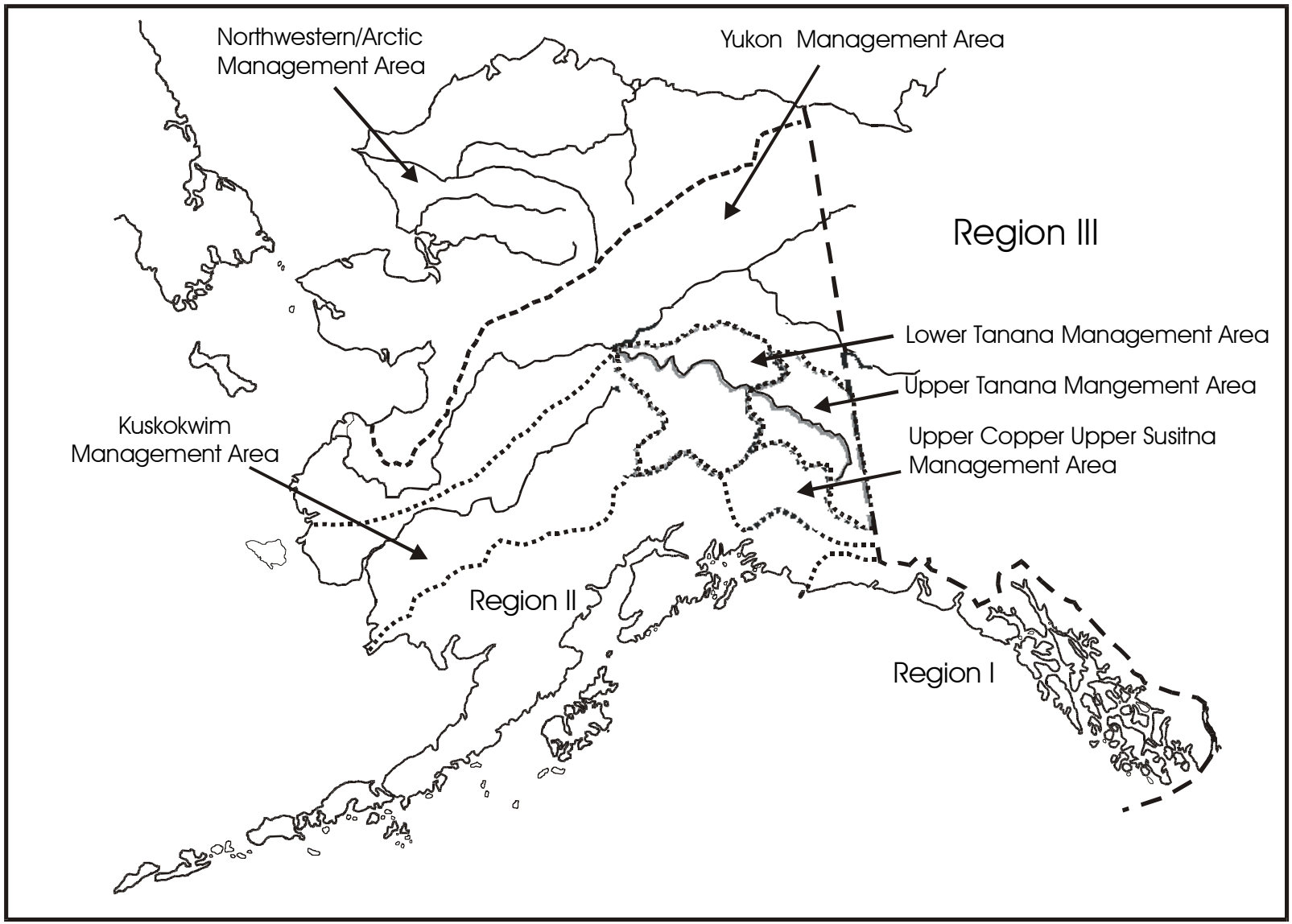

Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

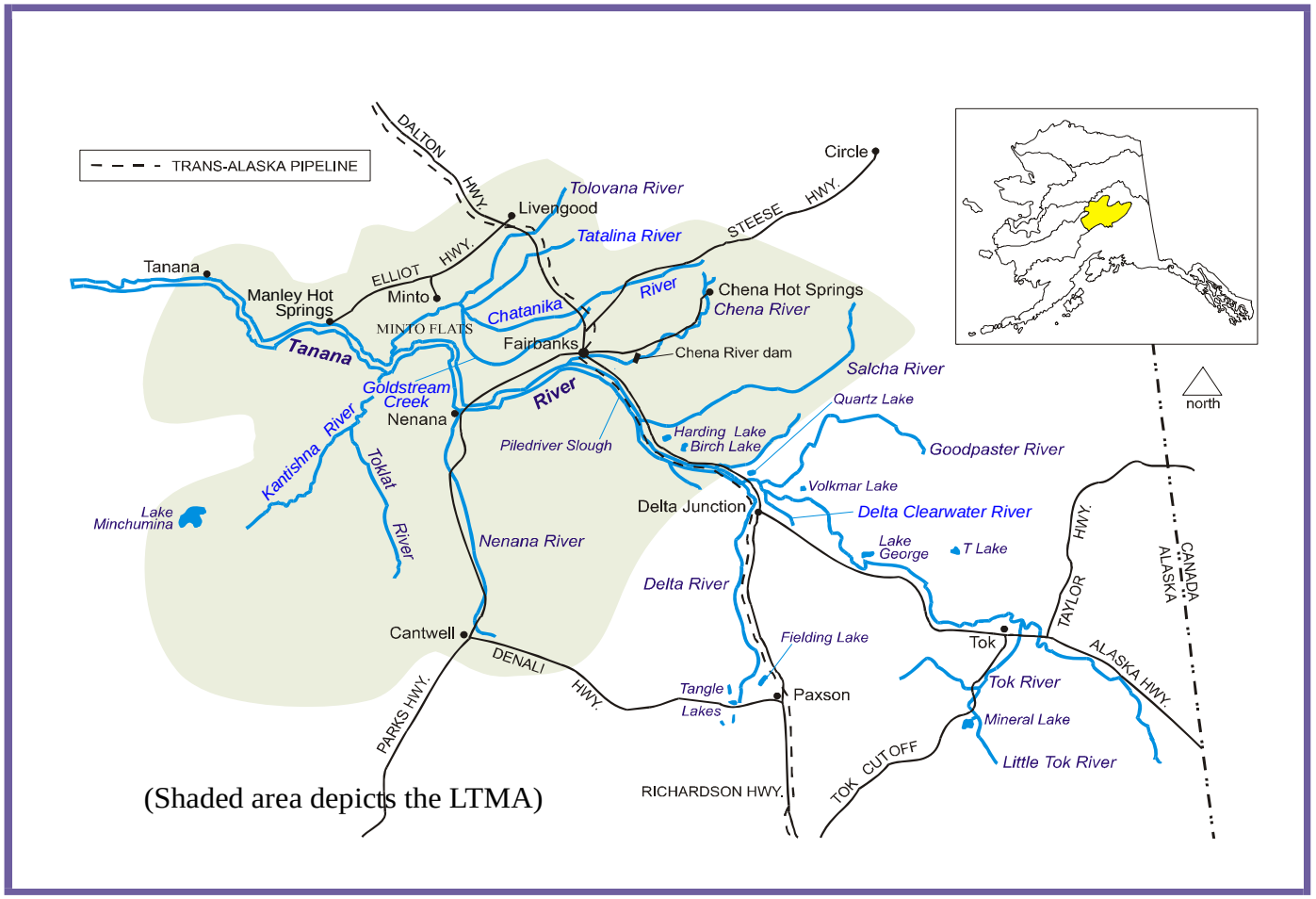

Figure 2.-Map of the Lower Tanana River Management Area (LTMA).

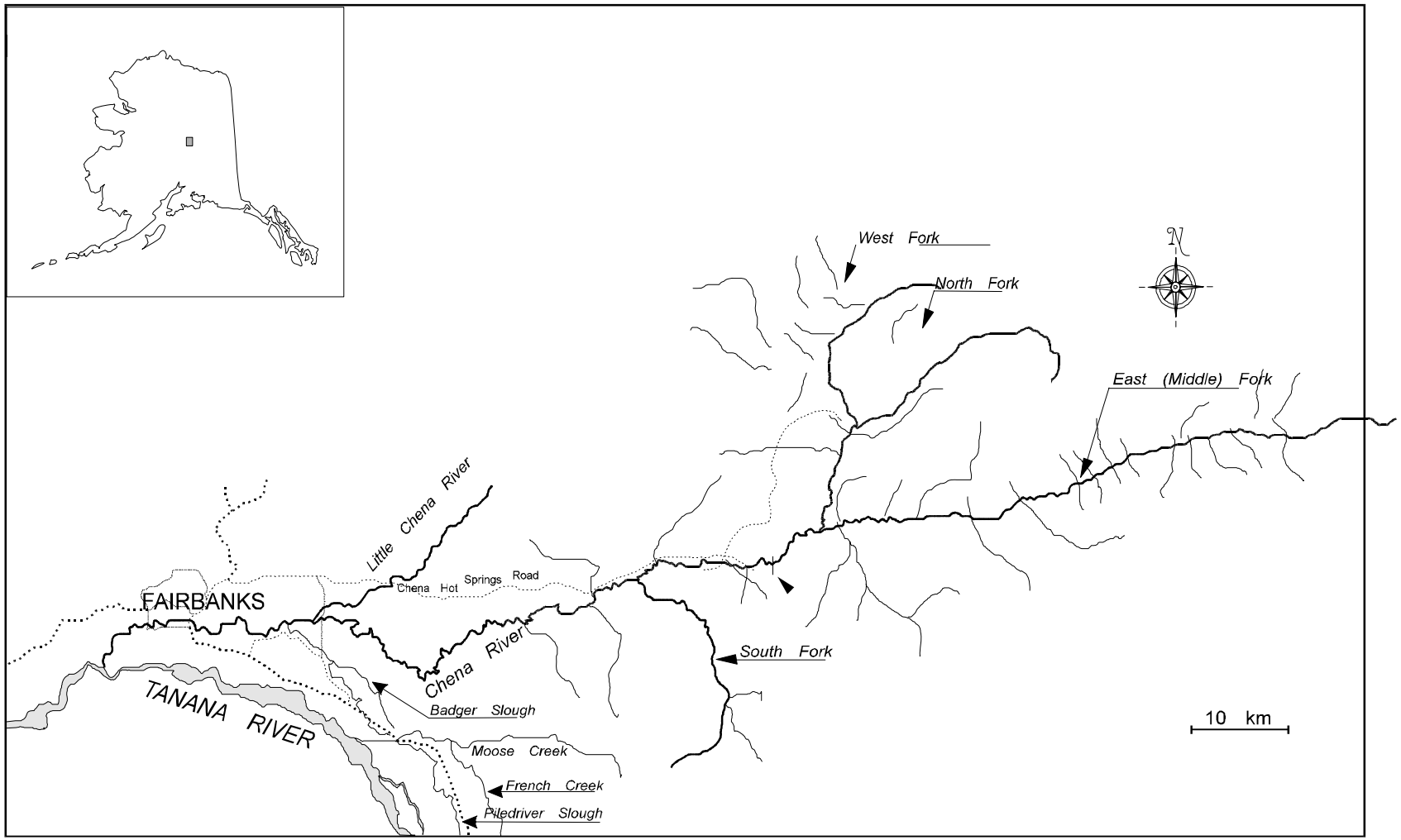

Figure 3.-The Chena River drainage.

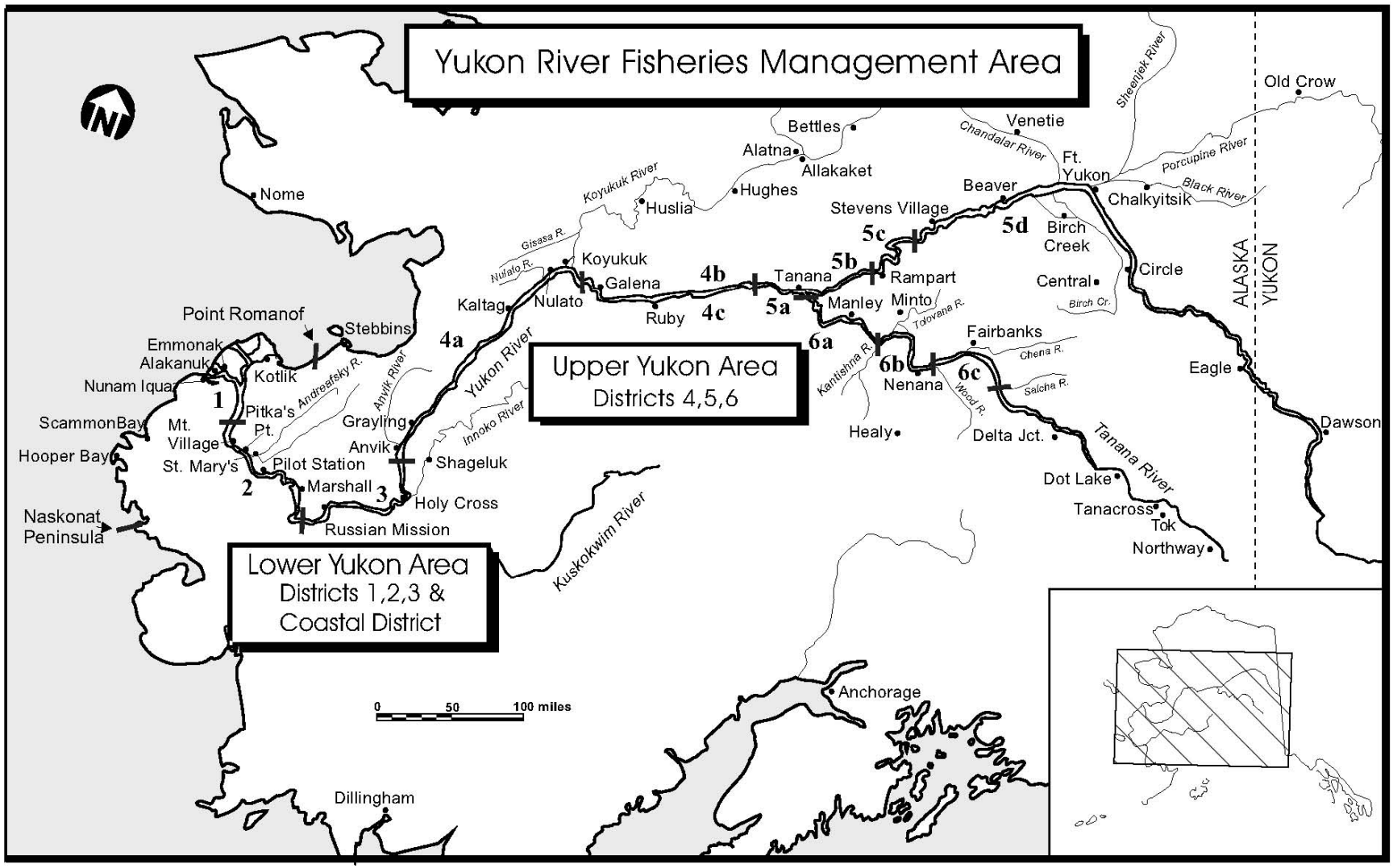

Figure 4.–Map of the Yukon River commercial fishing districts.

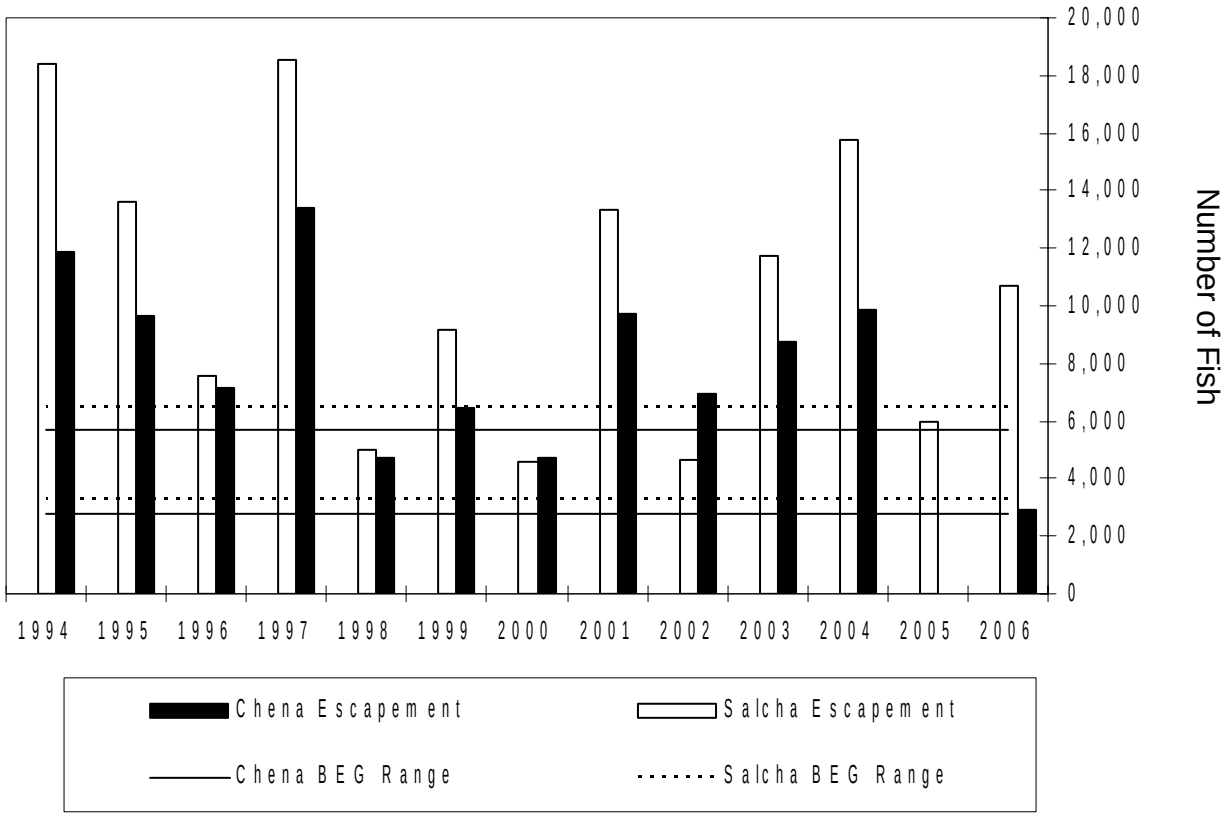

Figure 5.–Comparison of estimated Chinook salmon escapements to the Chena and Salcha rivers and the respective escapement goal ranges, 1994 – 2006.

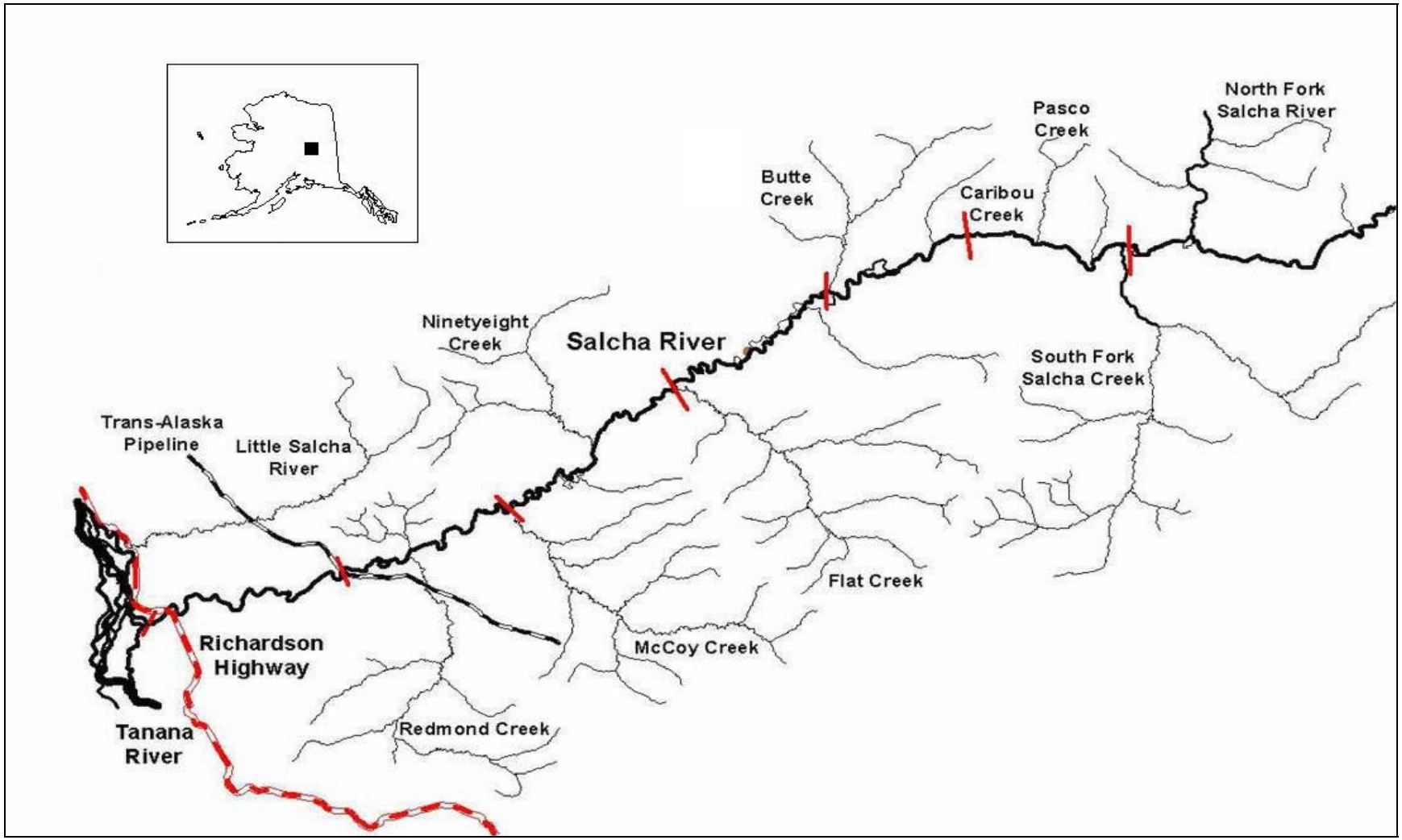

Figure 6.–Salcha River drainage.

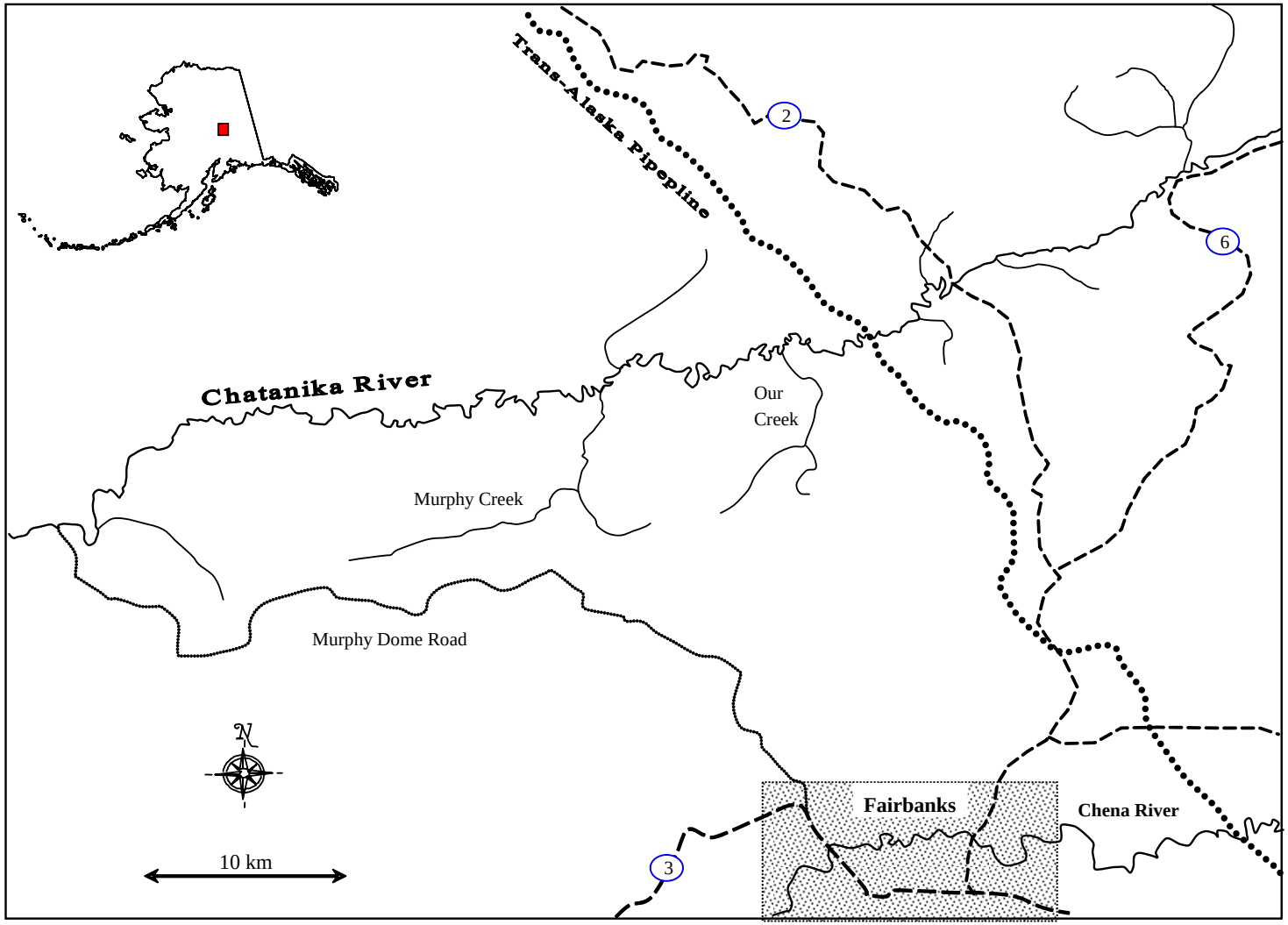

Figure 7.-Portion of the Chatanika River drainage.

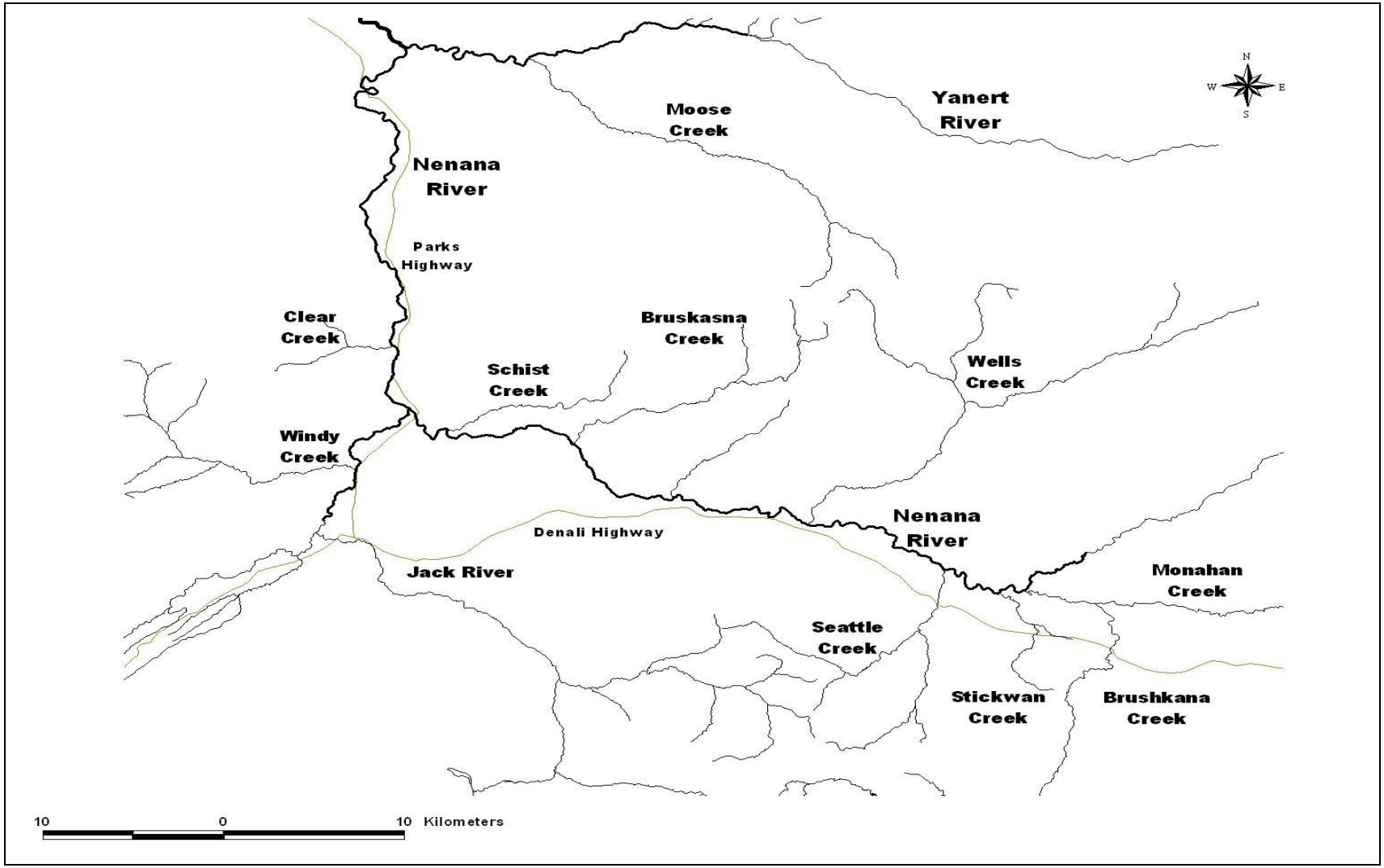

Figure 8.–Map of the Upper Nenana River drainage.

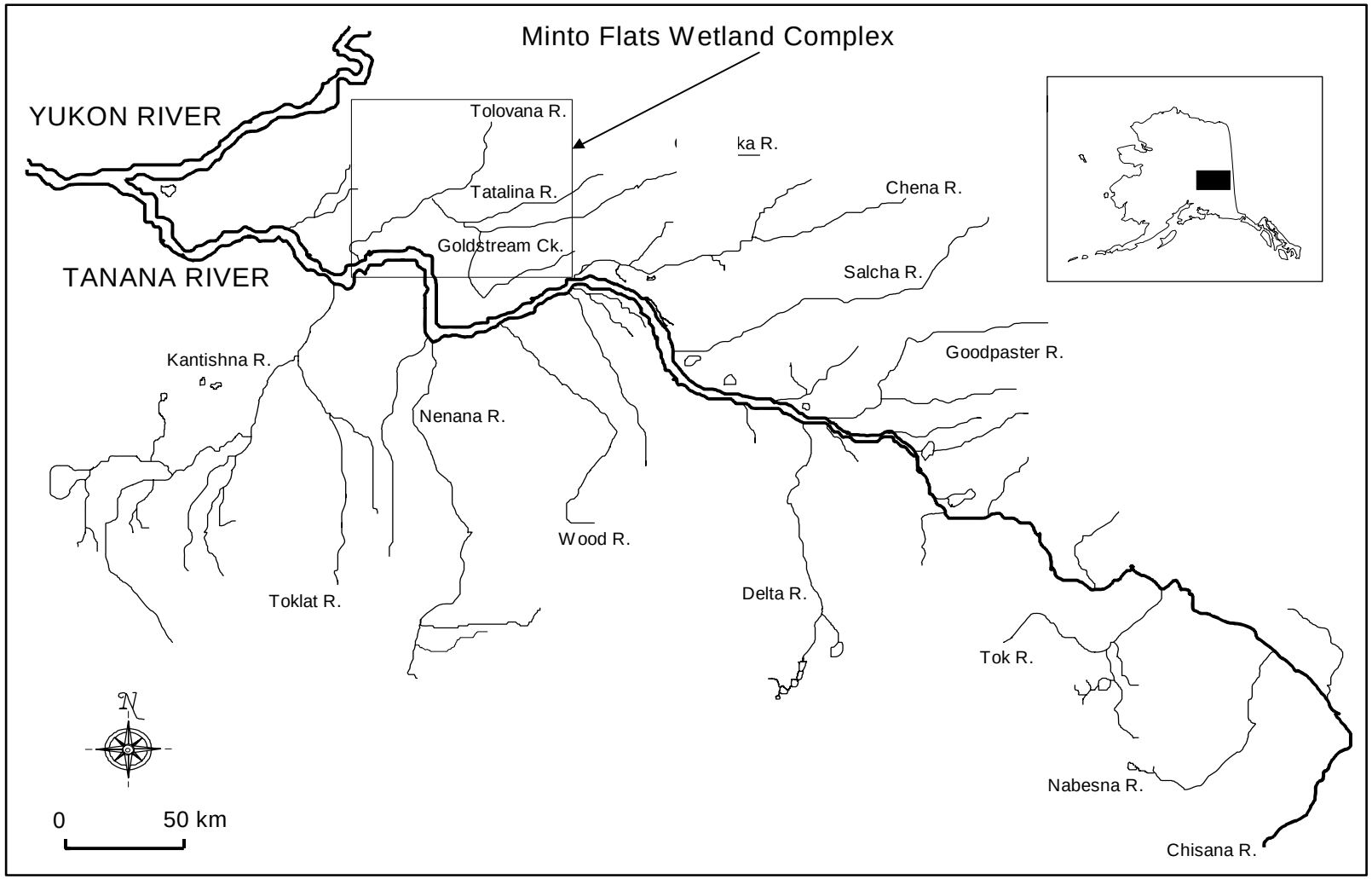

Figure 9.–Map of the Tanana River drainage and the demarcation of the Minto Flats wetland complex.

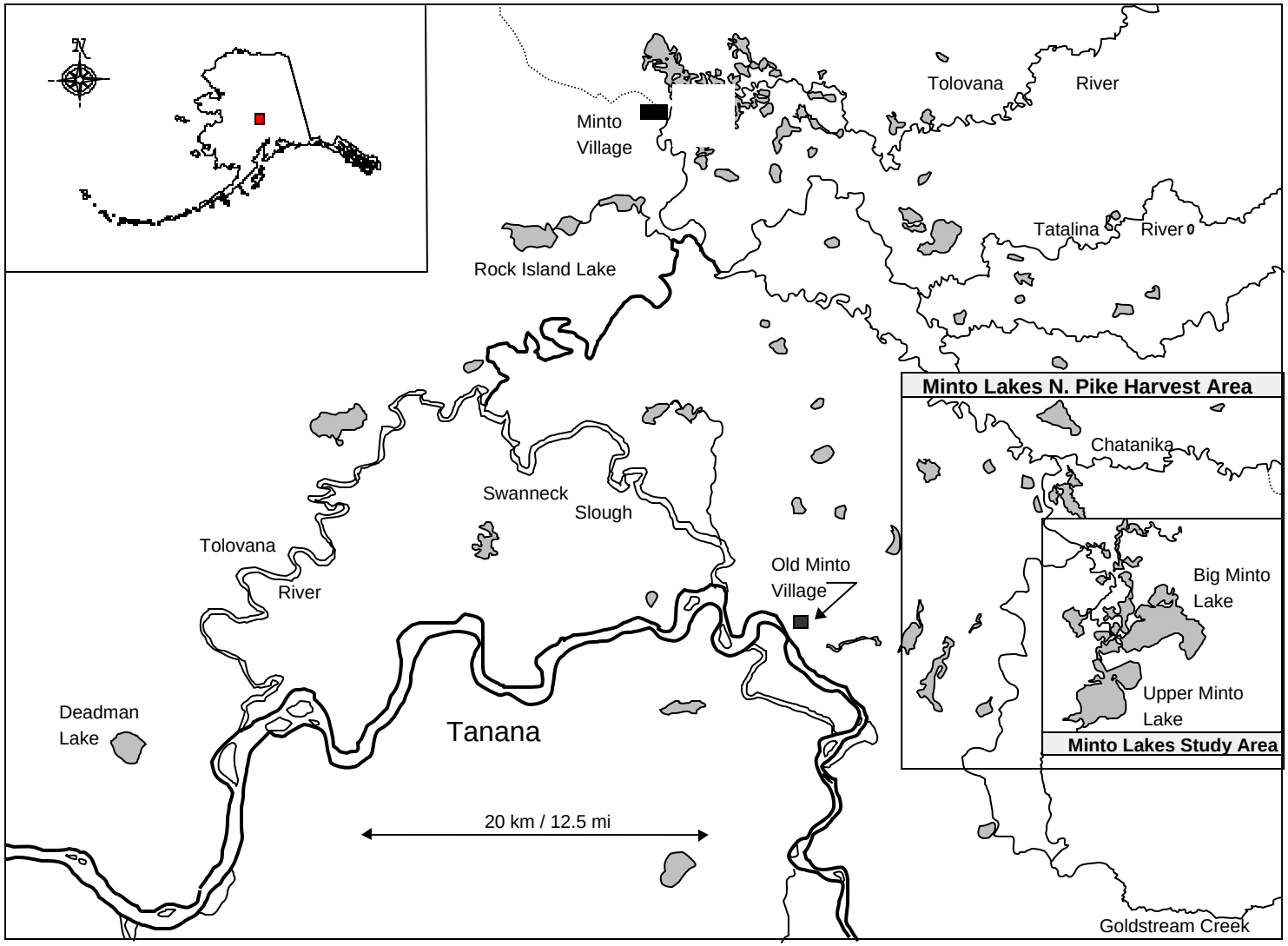

Figure 10.–Minto Flats wetland complex with demarcation of harvest reporting area and the northern pike population assessment area.

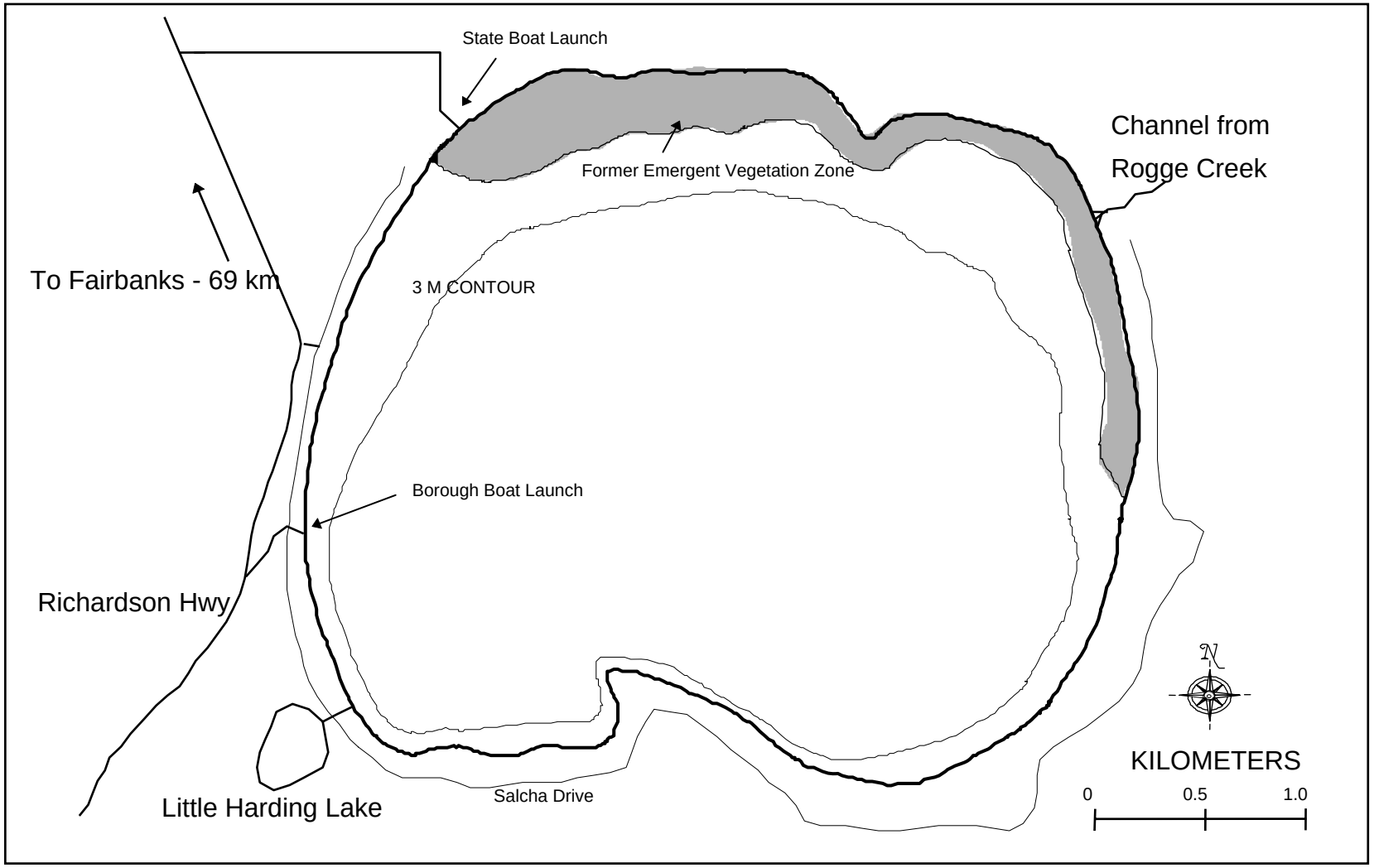

Figure 11.–Map of Harding Lake.

APPENDIX A

Appendix A.–Emergency orders issued for Lower Tanana River Management Area sport fisheries, 1990 - 2006.

Year	E. O. Number	Explanation
1990	3-WF-01-90	Closure of Chatanika River to the taking of whitefish by sport fishermen, effective October 11 – December 31, 1990.
1991	3-WF-03-91	Closure of Chatanika River and its tributaries to the taking of whitefish by sport fishermen, effective September 8 – December 31, 1991.
	3-AG-02-91	Closure of the Chena River to retention of Arctic grayling, effective July 1, 1991 until superseded by regulation or subsequent emergency order.
	3-NP-??-91	Harding Lake closed to spear and bow and arrow fishing, minimum legal size of Northern pike changed to 26 inches.
1992	3-S-06-92	Closes the Tanana River and its tributaries to sport fishing for salmon, effective July 24 – August 14, 1992.
1993	3-G-04-93	Piledriver Slough and 23 Mile Slough closed to retention of Arctic grayling, effective June 26, 1993 – December 31, 1995.
	3-KS-05-93	Increases daily bag and possession limit of Chinook salmon in the Chena River from 1 to 2 fish/ day, effective July 17 – December 31, 1993.
	3-KS-06-93	Increases daily bag and possession limit of Chinook salmon in the Salcha River from 1 to 2 fish/ day, effective July 23 – December 31, 1993.
	3-CS-07-93	Closes the Yukon River and all its tributaries to the retention of chum salmon, effective August 16 – December 31, 1993.
	3-SS-08-93	Closes the Yukon River and all its tributaries to the retention of coho salmon, effective September 3 – December 31, 1993.
1994	3-WF-06-94	Closure of Chatanika River to the taking of whitefish by sport fishermen, effective September 5 – December 31, 1994.
	3-KS-02-94	Increases daily bag and possession limit of Chinook salmon in the Chena and Salcha rivers from 1 to 2 fish/ day, effective July 22 – December 31, 1994.
	3-S-05-94	Closes the Yukon River upriver from the Koyukuk River and including the Tanana River to the retention of chum salmon, effective August 13 – December 31, 1993.
	3-S-06-94	Reopens the Yukon River upriver from the Koyukuk River and including the Tanana River to the retention of chum salmon, effective September 6 – December 31, 1993. Rescinds 3-S-05-94.
1995	3-WF-03-95	Closure of Chatanika River to whitefish sport fishing.
1996	3-AG-01-96	Closes Piledriver Slough and 23 Mile Slough to the retention of Arctic grayling.
	3-WF-03-96	Closes the Chatanika River to the taking of whitefish by sport fishermen, effective September 1, 1996 until superseded by subsequent emergency order

-continued-

Appendix A.–Page 2 of 3.

Year	E. O. Number	Explanation
1997	**No Emergency Orders Issued**	
1998	3-S-03-98	Restricts Chena, Salcha, and Chatanika rivers to catch and release for Chinook and chum salmon, effective July 23 – August 15, 1998.
	3-CS-04-98	Closes chum salmon sport fishing throughout Tanana drainage.
1999	**No Emergency Orders Issued**	
2000	3-NP-01-00	Closes all northern pike fishing in Harding Lake, effective June 1, 2000 until superseded by subsequent emergency order.
	3-KS-05-00	Closes the Tanana River drainage to sport fishing for Chinook and chum salmon, effective July 17 – August 20, 2000.
	3-KS-07-00	Closes the Yukon River drainage to sport fishing for Chinook and chum salmon, effective July 19 – August 14, 2000.
	3-CS-01-00	Closes fall chum salmon sport fishing in the Yukon River drainage, effective August 14 – December 31, 2000.
2001	3-NP-01-01	Rescinds E.O. closure for Harding Lake northern pike (in response to BOF action closing fishery)
	3-KS-04-01	Prohibits retention of Chinook salmon by sport anglers in the Tanana River drainage, effective July 7 – December 31, 2001.
	3-KS-06-01	Reopens Chena and Salcha rivers for Chinook salmon retention, effective July 20, 2001, the remainder of the Tanana River drainage remains closed through December 31, 2001.
	3-CS-01-01	Closes chum salmon sport fishing throughout the Tanana River drainage, effective July 7 – December 31, 2001.
2002	3-KS-03-02	Reduces sport fish bag limit to either one Chinook salmon or one chum salmon per day in the entire Yukon River drainage, effective June 19 – December 31, 2002.
	3-CS-01-02	Rescinds 3-KS-03-02 and closes the chum salmon sport fishery in all waters of the Yukon River drainage, effective August 11 – December 31, 2002.
2003	3-KS-02-03	Reduces sport fish bag limit to either one Chinook salmon or one chum salmon per day in the entire Yukon River drainage, effective May 30 – December 31, 2003.
	3-KS-04-03	Rescinds 3-KS-02-03 and restores daily bag and possession limits for Chinook and chum salmon in all waters of the Yukon River drainage, effective July 11, 2003.
	3-KS-05-03	Increases the Chinook salmon daily bag and possession limit to three fish in the Chena and Salcha rivers, and in the Tanana River within a 1/2 mile radius of the mouths of the Chena and Salcha rivers, effective July 12, 2003.
	3-CS-02-03	Closes chum salmon sport fishing in the entire Yukon River drainage, effective August 17 – December 31, 2003.
	3-CS-03-03	Rescinds 3-CS-02-03 and reopens chum salmon sport fishing in the entire Yukon River drainage, effective August 26, 2003.

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Year	E. O. Number	Explanation
2004	3-KS-01-04	Reduces sport fish bag limit to either one Chinook salmon or one chum salmon per day in the entire Yukon River drainage, effective May 3 – December 31, 2004.
	3-KS-04-04	Rescinds 3-KS-01-04 and restores daily bag and possession limits for Chinook and chum salmon in all waters of the Yukon River drainage, effective June 28, 2004.
	3-KS-07-04	Increases the Chinook salmon sport bag and possession limit to three fish 20 inches or greater in length in all waters of the Chena and Salcha rivers open to salmon fishing, and in the Tanana River within a 1/2 mile radius of the mouths of the Chena and Salcha rivers, effective July 15, 2004.
2005	**No Emergency Orders Issued**	
2006	3-KS-02-06	Increases the sport fish bag and possession limit for king salmon 20 inches or greater in length to two fish in all waters of the Salcha River open to salmon fishing and the Tanana River within a 1/2 mile radius of the mouth of the Salcha River, effective July 27, 2006.

APPENDIX B

Appendix B.-Total number of fish caught and harvested by sport anglers in the LTMA, by species, 1983-2005.

	Anadromous Salmon						Resident and Stocked Species					
	Chinook		Coho		Chum		Rainbow Trout		Landlocked Salmon		Lake Trout	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	992	N/A	84	N/A	582	N/A	18,009	N/A	10,048	N/A	31
1984	N/A	338	N/A	158	N/A	351	N/A	26,296	N/A	11,929	N/A	559
1985	N/A	1,356	N/A	25	N/A	1,023	N/A	20,150	N/A	14,278	N/A	46
1986	N/A	788	N/A	281	N/A	496	N/A	15,967	N/A	7,165	N/A	45
1987	N/A	492	N/A	0	N/A	578	N/A	19,865	N/A	9,984	N/A	109
1988	N/A	399	N/A	461	N/A	236	N/A	43,398	N/A	11,603	N/A	279
1989	N/A	460	N/A	493	N/A	969	N/A	39,685	N/A	8,490	N/A	567
1990	1,310	420	688	269	301	50	90,248	35,377	16,951	6,566	715	226
1991	1,197	630	1,900	443	588	385	82,345	40,039	16,417	10,604	545	461
1992	204	118	760	198	1,199	373	57,907	20,164	15,424	6,836	1,935	380
1993	5,017	1,691	291	29	2,135	317	82,695	27,976	9,952	5,976	955	412
1994	2,609	1,832	946	539	1,131	244	53,518	17,014	10,242	3,645	461	117
1995	5,675	2,419	1,130	593	2,828	1,252	59,254	18,743	10,140	3,497	702	258
1996	8,676	3,095	1,961	348	8,246	1,731	115,218	34,382	13,682	5,094	1,262	271
1997	6,566	1,943	1,264	342	1,697	456	68,025	21,516	11,967	3,701	1,029	348
1998	1,480	441	550	125	1,039	64	63,327	19,200	18,005	4,867	443	51
1999	3,435	1,006	331	141	1,654	388	79,297	27,067	10,025	2,590	1,118	384
2000	527	178	447	40	278	85	94,929	30,016	20,655	6,266	1,235	517
2001	2,414	667	892	180	661	29	37,391	11,811	12,719	5,085	1,299	209
2002	3,206	466	270	24	1,007	307	69,374	29,609	30,953	14,528	1,044	88
2003	6,851	2,136	633	11	1,531	50	54,189	16,530	12,821	4,663	642	56
2004	6,318	1,315	1,406	184	1,042	42	46,629	17,134	17,869	5,963	1,552	189
2005	1,633	483	14	0	686	144	29,292	11,493	9,000	2,054	1,514	514
10 Year Average 1995-2004	4,515	1,367	888	199	1,998	440	68,763	22,601	15,884	5,625	1,033	237
5-Year Average 2000-04	3,863	952	730	88	904	103	60,502	21,020	19,003	7,301	1,155	212
2005 as % 5-Year Average	42%	51%	2%	-	76%	140%	48%	55%	47%	28%	131%	243%

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Appendix B.-Page 2 of 2

	Resident and Stocked Species													
	Dolly Varden/ Arctic Char		Arctic Grayling		Northern Pike		Whitefish		Burbot		Sheefish		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	212	N/A	60,748	N/A	7,898	N/A	7,436	N/A	3,350	N/A	157	N/A	109,547
1984	N/A	13	N/A	61,560	N/A	6,357	N/A	10,742	N/A	3,131	N/A	320	N/A	121,754
1985	N/A	1,171	N/A	36,711	N/A	8,824	N/A	18,840	N/A	3,566	N/A	385	N/A	106,375
1986	N/A	37	N/A	30,398	N/A	8,112	N/A	26,995	N/A	6,618	N/A	53	N/A	96,955
1987	N/A	30	N/A	24,723	N/A	6,105	N/A	25,937	N/A	2,128	N/A	223	N/A	90,174
1988	N/A	418	N/A	36,489	N/A	7,599	N/A	9,123	N/A	1,922	N/A	770	N/A	112,697
1989	N/A	682	N/A	39,407	N/A	8,310	N/A	16,688	N/A	2,969	N/A	403	N/A	119,123
1990	1,873	557	122,342	17,732	23,964	5,414	8,014	6,299	2,701	2,207	255	68	269,361	75,185
1991	2,705	909	98,562	18,503	23,037	9,426	551	356	1,920	1,323	203	158	229,970	83,237
1992	5,151	1,597	78,820	8,275	24,477	4,200	3,140	2,810	2,964	2,368	612	148	192,594	47,467
1993	6,962	3,536	127,383	11,377	41,809	7,743	948	722	4,164	3,547	190	164	282,500	63,490
1994	2,923	1,129	171,968	11,826	76,372	13,200	1,677	242	3,154	2,551	267	163	325,269	52,501
1995	5,650	2,140	105,251	16,291	43,325	10,834	1,187	578	4,113	2,936	482	200	239,737	59,741
1996	6,139	1,963	123,971	5,073	34,867	4,890	660	149	1,935	1,378	219	40	316,837	58,414
1997	6,815	1,820	204,338	8,598	19,186	2,320	1,404	773	4,935	3,824	486	35	327,712	45,677
1998	5,898	2,528	179,855	5,914	12,964	2,003	1,115	490	2,832	2,088	79	17	287,586	37,789
1999	7,516	2,507	157,762	6,729	10,641	2,013	976	219	3,195	2,049	173	121	276,123	45,216
2000	6,866	2,527	92,462	4,829	13,585	2,793	847	313	3,312	2,032	312	187	235,455	49,783
2001	5,688	1,632	71,227	2,692	13,117	3,296	883	221	1,265	759	41	9	147,597	26,580
2002	9,151	4,392	119,845	11,101	19,646	3,043	1,247	936	3,371	2,787	50	45	259,165	67,326
2003	8,244	3,179	88,242	5,416	20,150	5,416	741	167	1,851	1,375	415	59	196,310	39,058
2004	10,658	3,313	99,851	4,144	31,172	4,259	1,515	1,244	3,743	2,771	450	138	222,205	40,696
2005	6,452	2,289	74,070	5,397	26,171	3,319	227	54	1,856	1,466	454	129	151,369	27,342
10 Yr Avg 1995-2004	7,263	2,600	124,280	7,079	21,865	4,087	1,057	509	3,055	2,200	271	94	250,873	47,028
5 Yr Avg 2000-04	8,121	3,009	94,325	5,637	19,534	3,761	1,046	576	2,708	1,945	254	107	212,146	44,689
2005 as % 5 Yr Avg	79%	76%	79%	96%	134%	88%	22%	9%	69%	75%	179%	120%	71%	61%

Source Data from: Mills (1979–1994); Howe et al. (1995, 1996, 2001a-d); Walker et al. (2003); and, Jennings et al. (2004, 2006 a-b, *In prep a-b*).

APPENDIX C

Appendix C.–Estimates of effort (number of days fished) for select areas of the LTMA, 1977-2005.[a]

Year	Upper Chena	Lower Chena	Total Chena River [a]	Piledriver Slough[a]	Upper Chatanika	Lower Chatanika	Total Chatanika River	Salcha River	Harding Lake [b]	Minto Flats	Nenana Drainage[c]	Total LTMA
1977	N/A	N/A	30,002	N/A	N/A	N/A	9,925	8,167	N/A	3,886	N/A	-
1978	N/A	N/A	38,341	N/A	N/A	N/A	10,835	9,715	N/A	3,640	N/A	-
1979	8,016	14,122	22,138	N/A	N/A	N/A	4,853	14,788	N/A	2,709	N/A	-
1980	10,734	19,920	30,654	N/A	N/A	N/A	5,576	8,858	N/A	2,727	N/A	-
1981	10,740	16,013	26,753	N/A	N/A	N/A	4,691	8,090	N/A	2,045	N/A	-
1982	15,166	25,369	40,535	N/A	N/A	N/A	9,417	14,126	N/A	1,791	N/A	-
1983	16,725	17,568	34,293	4,148	N/A	N/A	10,757	11,802	708	1,281	N/A	-
1984	13,135	20,556	33,691	4,651	N/A	N/A	8,605	8,449	1,707	1,829	N/A	-
1985	8,568	11,169	19,737	N/A	N/A	N/A	10,231	13,109	850	2,011	329	-
1986	10,688	18,669	29,357	N/A	N/A	N/A	7,783	13,792	2,064	3,318	550	-
1987	10,667	12,605	23,272	13,257	N/A	N/A	11,065	10,576	5,125	1,539	2,249	-
1988	9,677	16,244	25,921	24,375	N/A	N/A	11,642	7,494	3,256	1,564	2,897	-
1989	10,014	20,317	30,331	22,746	N/A	N/A	12,210	9,704	4,935	699	1,586	-
1990	6,949	18,957	25,906	27,705	N/A	N/A	11,801	9,783	3,895	932	1,449	98,317
1991	8,591	12,547	21,138	17,703	N/A	N/A	8,085	11,242	5,155	1,532	2,131	81,254
1992	4,983	7,383	12,633	13,607	N/A	N/A	6,775	4,833	5,068	2,401	2,487	67,395
1993	6,018	15,383	21,589	17,253	N/A	N/A	7,671	7,313	4,885	3,911	2,138	88,243
1994	7,912	18,718	27,061	11,369	N/A	N/A	7,272	7,653	4,913	6,267	2,060	83,620
1995	13,319	23,219	37,220	12,613	5,709	6,988	13,145	14,516	6,743	6,260	2,645	114,388
1996	15,214	29,555	45,928	11,736	4,867	6,257	12,032	13,046	6,734	3,973	2,854	117,364
1997	11,381	16,957	28,873	6,791	2,612	4,290	7,125	8,647	3,383	3,332	2,463	71,280
1998	10,826	15,277	27,910	5,126	3,433	2,140	6,000	5,789	3,410	1,414	1,853	62,298
1999	18,909	20,834	40,435	8,955	4,102	4,477	8,747	7,539	2,973	2,431	955	72,673
2000	10,259	11,138	22,029	6,234	2,836	2,799	5,748	4,862	2,538	1,230	786	57,482
2001	6,831	12,346	19,177	5,190	1,372	1,308	2,680	5,471	1,038	1,118	1,195	40,408
2002	6,298	14,017	20,315	4,246	1,907	1,937	3,844	5,954	2,094	2,349	2,061	47,445
2003	7,374	14,454	21,828	2,317	1,834	2,849	4,683	5,032	2,246	2,023	1,834	48,300
2004	11,320	20,165	31,485	2,546	2,917	2,570	5,487	4,859	2,675	1,892	1,801	54,651
2005	8,773	8,718	17,491	1,079	2,711	1,894	4,605	4,851	1,118	3,124	2,086	64,891
10 Yr Average 1995-2004	11,173	17,796	29,520	6,575	3,159	3,562	6,949	7,572	3,383	2,602	1,845	68,629
5 Yr Average 2000-04	8,416	14,424	22,967	4,107	2,173	2,293	4,488	5,236	2,118	1,722	1,535	49,657
2005 as a % of 5 Yr Avg	104%	60%	76%	26%	125%	83%	103%	93%	53%	181%	136%	131%

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[a] Data from: Mills (1979–1994); Howe et al. (1995, 1996, 2001a-d); Walker et al. (2003); and, Jennings et al. (2004, 2006 a-b, *In prep a-b*).

[b] Harding Lake was closed to northern pike fishing in the summer of 2000.

[c] Includes Brushkana Creek.

APPENDIX D

Appendix D.–LTMA regulation proposals and pertinent reference pages in this FMR for the Alaska Board of Fisheries in Anchorage, 2007.

		Text	Table(s)		Figure(s)	
Proposal(s)	Description	Page	Number	Page	Number	Page
129, 137	Lake Trout Sport Fisheries	31	21	65	11	77
132	Tanana River Drainage Northern Pike Sport Fisheries	21	13, 14, 15, 16	57 - 60	9, 10, 11	75 - 77
124	Chena River Arctic Grayling Sport Fishery	15	9, 10	52 - 54	3	69
131, 136	Stocked Waters	33	22	66	-	-
138, 139	Chatanika River Whitefish	28	19, 20	63 - 64	7	73
177	Salcha River King Salmon Sport Fishery	11	3, 4, 5, 6	44 - 48	6	72